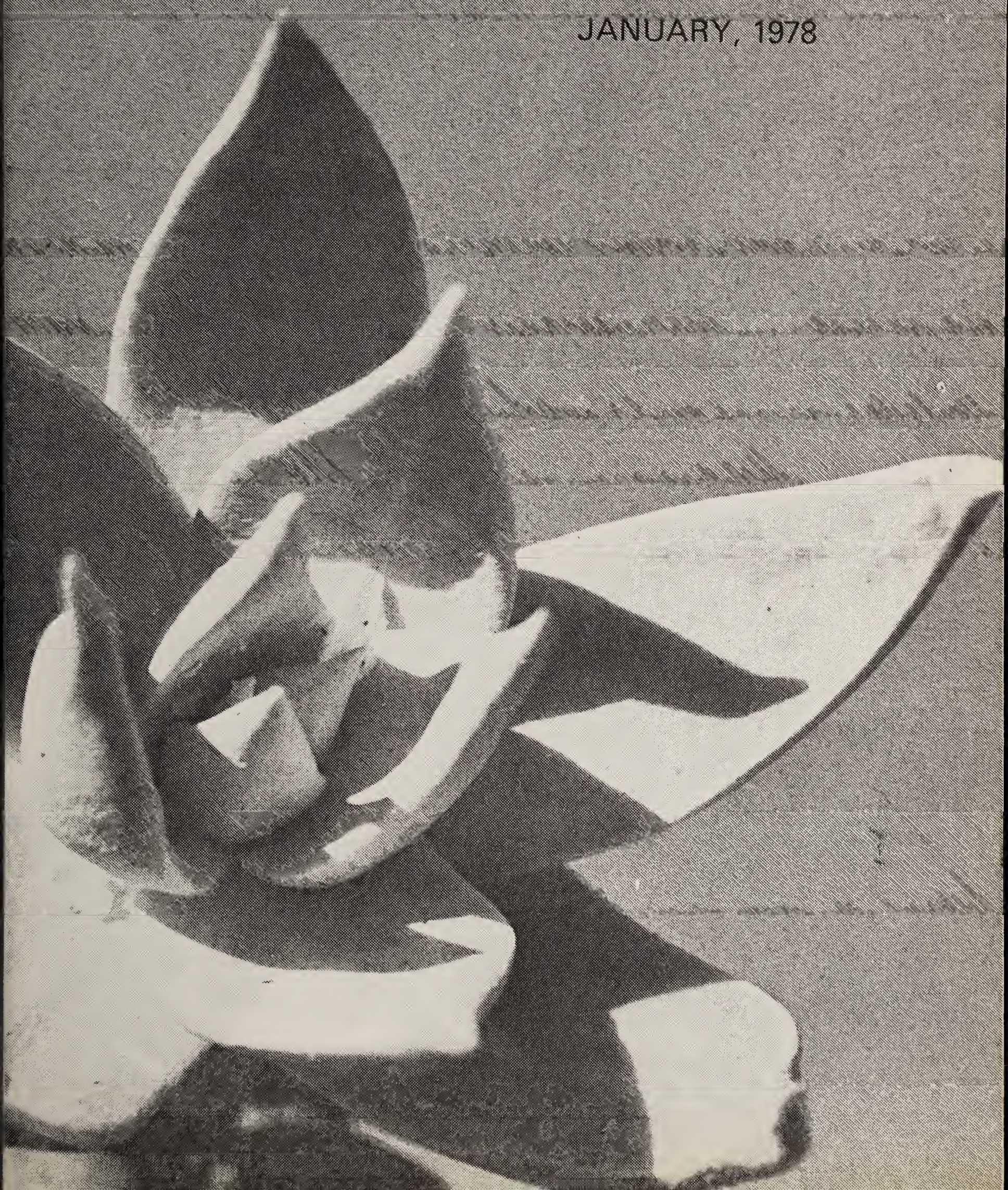
SAGUAROLAND BULLETIN

JANUARY, 1978



SAGUAROLAND BULLETIN Editor, Lillian Diven

JANUARY, 1978 Vol. XXXII No. 1

DESERT BOTANICAL GARDEN

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Cover: *Dudleya pulverulenta* (Nutt.) B. & R. ssp. *arizonica* (Rose) Moran

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Published and owned by the Arizona Cactus and Native Flora Society, sponsors of the Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. The Saguaroland Bulletin is published to disseminate information on the Garden and on desert plants and their culture. Issued 10 times a year.

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News & Notes

To Our Garden Friends and Members:

I would like to share with you my pleasure and pride in the Garden's accomplishments this year. Under the able leadership of Rodney Engard, our Superintendent, the recent achievements of our excellent staff and wonderul volunteers certainly deserve notice.

The Garden has made fine progress in four important areas — botanical activities, finance, improvements and public programs. The following notes cover only the first half of the current fiscal year, and touch only some of the highlights, in the interest of brevity, but I feel that you will agree with me that they give us all reason to be proud.

Mildred F. May
President, Board of Directors

Botanical Activities

Dr. Gentry's "Agaves of Baja California" has been scheduled for publication in early 1978.

J. Harry Lehr, Curator of the Herbarium, has in manuscript a long-needed updated Check List of the Vascular Plants of Arizona.

The Garden completed work in a habitat analysis of 5 species of plants on the Endangered Species List for the Bureau of Land Management. Research and work on jojoba physiology by a doctoral candidate from Arizona State University continues. The Garden was one of the bases for USDA Jojoba Survey.

Financial

Attendance figures April-September were about the same as the same period in 1976. Admissions increased more than 40 percent. The Garden began to charge admission fees in early June. It is apparent that there was no need to fear lowered attendance as a result of the paid-admission policy.

Improvements, etc.

During the summer over 6,000 ft. of paths were repaved, parking lots resurfaced, the service road and auditorium parking lot surfaced for the first time. New paths were constructed to allow visitors safe access to areas previously closed to the public.

Badly-needed library equipment has been purchased.

As a matter of policy, the Garden participates actively in operations involving the "rescue" of desert plants. The staff has brought back to the Garden over 600 plants, some of them rare, from areas scheduled for habitat destruction — Central Arizona Project right of way, a quarry operation east of Tucson, two proposed mine-tailings sites. Our activity in this area promotes further cooperation with government and private concerns.

New installation of drip irrigations systems has doubled the area being watered this water-saving and labor-saving way.

Additions to the staff: full-time plant propagator, assistant to education director, maintenance, full-time security, two work-study program students on grounds maintenance.

Public programs

Between June and September, 10 events were held at the Garden, although until this

year no public activities were held from mid-May to October. The Garden is now open daily until sunset.

Between June and October, 14 different classes of two to six sessions each were offered. Summer classes and workships were held, as well as an overnight field trip to Aravaipa Canyon. Total class attendance came to 741.

Field trips are now two per month October through May, one for members only, one open to the public. A very successful October special field trip that went by chartered bus to California gardens and nurseries had 40 participants.

More overnight field trips are being arranged, since Members were enthusiastic about the Aravaipa and California trips. One will likely be to the Chiricahua Mountains in southeast Arizona, on the upper edge of the Chihuahuan Desert — most Arizona desert is Sonoran.

A recognized need for trained guides has resulted in a Docent Training Program. The first class was held in October, with 27 persons enrolled for a six-session course plus monthly updating meetings. Each docent will spend 16 hours a month as a Garden Guide from October through May. There is already a waiting list for next spring's training course.

The Botanical Print Show this fall, with prints (1730s to present), original botanical drawings, and rare botanical books from the Garden's own collection, was an impressive success. It was a comprehensive show, documented, and professionally displayed.

A poster of the Garden's logo, a quality reproduction of a botanical print from our library, and a limited-edition portfolio of botanical drawings by Wendy Hodgson have been published.

The Art Show and the Photography Show are now separated from the Cactus Show. A very successful art show was held in November, and the photo show, opening in late January, is already drawing entry applications.

The Garden's entry in the Arizona State Fair, adapted from our display earlier this year at the Phoenix Civic Center, took first place in its category.

Public awareness is increasing, we think, as the result of more coverage by the media. Examples: local radio and radio and television interviews, articles in local and national magazines, articles in the Tucson press, even an interview by the British Broadcasting Company.

Response to the Garden's expanded program of classes and workshops has been more than gratifying, and shows that there is lively community interest in the kind of activities the Garden is best qualified to schedule.

Ethnobotany Project

The extensive canal systems developed by the Hohokam Indians on the flat land of the Salt River Valley are well-known and understood, but much less known are the other water control systems developed by these Indians on hillsides. The Desert Botanical Garden, in cooperation with the Department of Anthropology of Arizona State University, has begun a project to investigate these water control devices and to demonstrate them for the public. As a first step in the project, Dr. Alfred E. Dittert brought his Cultural Resource Methods class to the Garden to survey the proposed area. Two natural drainage systems were chosen as meeting the necessary requirements for the experiment and display, and the area was mapped. Since the area would be impacted by the project, Dr. Dittert had his students conduct a survey for artifacts over the entire three acres under consideration. About 40 man-made stone objects were recovered. Soil samples were also taken to check for pH and other factors that would affect agriculture.

The locality was given an official archaeological designation, AZ U:9:78, and added to the site files at A.S.U. Unlike other archaeological sites which are excavated, vandalized, or destroyed in the name of progress, AZ U:9:78 will have much more added to it over the years than will be taken away or destroyed. A series of dams, stone borders, and terraces will be built to control the flow of water through the drainage systems and divert it onto terraces where it can be used to nourish crops. The anthropologists will be using two nearby water control systems as models, one located on the south side of the Salt River near the Tempe Buttes, the other on the north side of the Salt River in an undeveloped portion of Papago Park. The systems serving as models appear to date from the Sacaton and Classic periods of Hohokam, around 1100 A.D., but may have been used into historic times by Pima and Yavapai Indians.

The anthropologists will be keeping careful notes on the labor and materials required to build the system, how effectively the catchment and diversion dams trap water and divert it to where it can be used, how much time it takes for soil to build up within grid borders and along terraces, and, of course, how effective the entire system is in producing crops. However, Garden visitors will not have to wait for completion of the archaeological exhibit to see Indian desert agriculture in action. A number of plants have already been acquired (in seed form) from Papago and Pima Indians through the assistance of Dr. Donald Bahr, Gary Nabhan, and Howard Smith. Included are Pima Squash (**Cucurbita mixta**), tepary beans (**Phaseolus acutifolius**), variegated lima bean (**Phaseolus lunatus**), Pima corn (**Zea mays**), bottle (rattle) gourds (**Lagenaria siceraria**), and a domesticated form of devil's claw (**Proboscidea parviflora**) with white seeds and extra long claws. These plants will be grown in the Garden in 1978 beginning with the lima beans which are planted as early as February. A Pima Squash is currently on exhibit at the Garden.

Another aspect of the project involves the identification of wild desert plants growing at the Garden which were utilized by the Indians for food, medicine, decoration and building supplies. Such plants would include trees like the mesquite and palo verde which produce edible seeds, cacti with edible flower buds or fruit, other plants that produce berries or edible roots, fibers from the yucca which are used as soap, gum from the mesquite used as a hair dye, fibers used in basketry, flowers used in religious ceremonies and lichens for sand painting.

—Charles F. Merbs

Dr. Merbs is Chairman of the Anthropology Department of Arizona State University, and a member of the Garden's Advisory Board.

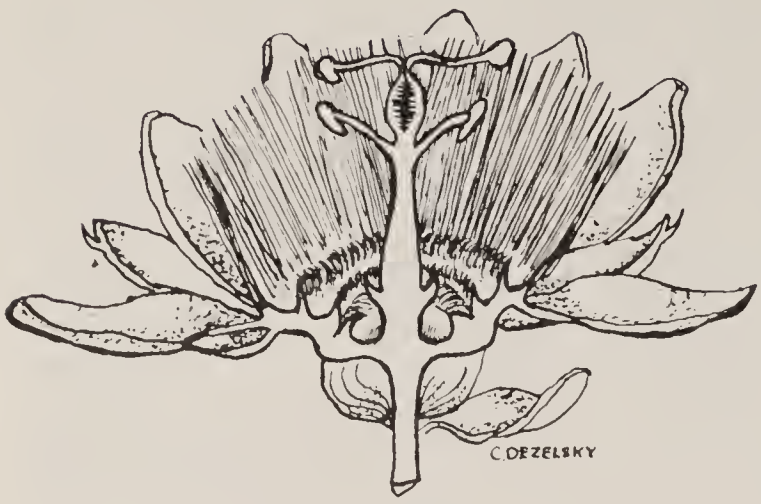
An Inventory of the Agaves

Last fall the time arrived for me to review the Agave specimens in the National Herbarium. On the way to Washington a stopover was arranged at the Missouri Botanical Garden in St. Louis, where Trelease had worked on Agaves early in the present century, and where the Agave collection is an important one. The herbarium there is housed in a new modern building with walls of one-way glass — when you are inside you can look out over the beautiful grounds, but no one can see in. Herbarium specimens are housed in banks of doorless cases which with the press of a button slide out like electronically-controlled sliding doors. This modern facility has been referred to as the "compacted herbarium," and there is probably less wasted space here than anywhere else. As soon as I arrived on September 26th, I was taken to an ample table and shown which button to press. Like Ali Baba's "Open Sesame" the button opened their treasury of Agave specimens, and my work began.

On October 2nd I flew on to Washington

(continued on page 11)

Passionflowers — Cultivated and Native



Structure of a typical Passiflora flower. (Drawing by C. Dezelsky.)

Most gardeners in Central Arizona are familiar with one or more of the three Passionflower vines commonly cultivated in the area: **Passiflora caerulea, P. X alato-caerulea** and **P. edulis.** They belong to a mainly tropical American genus, and thrive here in warm, protected sites. They climb by means of tendrils on trellises and walls. All have spectacular and peculiar flowers. The flowers are axillary, solitary or in pairs. The peduncle bears a bract in various positions beneath the flower. This bract is sometimes colored and subtends the flower, forming an involucre. The calyx tube is cup-shaped or cylindrical. Five calyx lobes are usually present. The petals number 5 or none, depending on the species. If present, they are usually smaller than the sepals and adnate to the calyx tube margin.

At this point the flower departs from typical flower morphology. A fringe of one or more concentric rings of filaments (not staminal in origin, but appendages of the perianth) develops from the base of the perianth. Just inside these rings is another outgrowth of the petals, called the operculum. This delicate membrane protects yet another concentric ring of perianth tissue called the annulus. From this tissue the nectary develops.

From the center of this last ring the functional reproductive organs appear, perched atop or adnate to the androgynophore — the axis of the fused filaments and the stipe. There are five stamens fused to the stipe. The free distal ends subtend the ovary and generally flare out from it at anthesis. The three to five styles may be connate or free from one another. The stigmas are generally capitate, at the ends of long horizontal or recurved styles (at least in the native and cultivated Arizona species). One result of all this complicated morphology is that the ovary is superior. It consists of one pistil, which is unilocular although three-to-five-carpelate. The placentation is parietal (the seeds being attached to the outside wall of the fruit). There are many arillate seeds in each carpel.

Arizona has, in addition to the cultivated species mentioned above, three native species with similar flower structure. All three occur only in the southern tier of counties along the Mexico-U.S. border. **Passiflora mexicana** Juss. occurs between 2,500 and 5,000 feet, along streams and dry stream beds, and occasionally on dry mesas. This species and the following two are also found in Mexico. It is a perennial vine which climbs to a height of at least fifteen feet. **P. mexicana** is easily distinguished from all other native and locally cultivated Passionflowers by its leaves alone. They are deeply two-lobed and have a pattern of yellowish gland-like blotches on either side of the short mid-vein. These blotches vary in number, but generally appear in short distinct rows. They are called ocellae (little eyes). This plant is glabrous, which also distinguishes it from the other native species. The flowers are diurnal, 2.5 to 4 cm wide, the corona fringe being reddish to maroon. The fruit is a smooth blue-black berry filled with arillate sweet-smelling seeds.

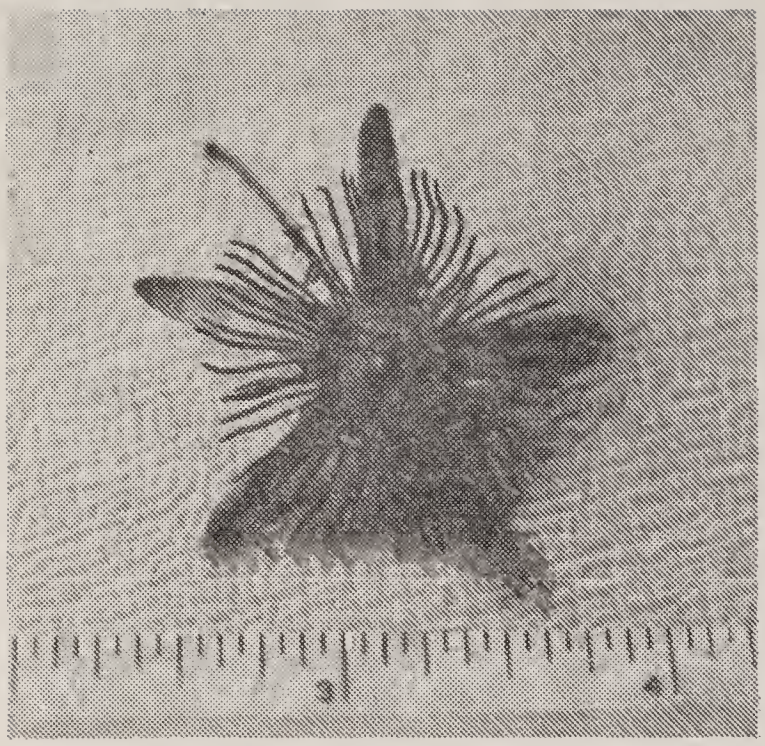
P. foetida L. is a widespread species

occuring in Arizona, Mexico and Texas, and nearly throughout tropical and subtropical America. Our variety, **arizonica** Killips, is described from the Baboquivari Mountains and is known only from Arizona and Sonora. It occurs in Pima County between 4,000 and 5,500 feet in thickets. I have seen it growing on open south-facing slopes, scandent on rock outcrops. The specific name **foetida** refers to the somewhat unpleasant odor which results when the plant is crushed. The leaves, 5 cm long, 5 cm wide at the widest point, are palmately 3-to-5-lobed, densely villous and somewhat viscid. The flowers are 2 to 5 cm wide, vespertine, the corona white, pink or lavender. The vespertine habit I discovered after having left the plant unphotographed because of fading light one evening. I returned the following morning, camera at the ready, and was presented with an entire plant full of wilted flowers. Fortunately, I had had the presence of mind to make adequate herbarium specimens the preceeding evening. The fruit is three-carpeled, pilose, yellowish berry about 5 cm long and 3 cm in diameter. It differs from **P. mexicana** also in that the carpels are clearly evident from the undulation of the fruit surface. Both **P. mexicana** and **P. foetida** var. **arizonica** were flowering in mid-August in the Las Guijas Mountains where the accompanying pictures were taken. The third and last native Passiflora is **P. bryonioides** H.B.K. which occurs in Santa Cruz County near Ruby and Pena Blanca Lake. Its leaves are deeply 3-to-5-lobed (more deeply so than **P. foetida**), and hispidulous. The lobes are entire to remotely and sparsely-toothed. One feature which distinguishes **P. bryonioides** for our other two Passionflowers is the presence of two stalked opposite or subopposite glands near the distal end of the petiole. They are obvious on even perfunctory inspection. Flowers are 2 to 3 cm wide with yellowish sepals and only a single-fringed corona. Petals are white. Filaments of the corona are purplish at the base.

None of the native species is known to be in cultivation, although our propagator has recently planted seed from this summer's seed crop. Germination of green seed of **P. foetida** has been quick. No germination of

Two ocellae are visible in this two-lobed leaf of *P. mexicana*.

Cross-section of a green *P. foetida* fruit. It is about 4 cm across.



The green-and-maroon flower of *P. mexicana*, Las Guijas Mtns., Arizona.

ripe **P. mexicana** seed has been obtained. Seed of **P. bryonioides** has not been collected. The fruits of some cultivated species are edible and produce the Granadilla of commerce.

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Kearney & Peebles, **Arizona Flora**

Lawrence, **Taxonomy of Vascular Plants**

Pinkava & Lehto, **A Veg. Key to the Cultivated Woody Plants of the Salt River Valley, Arizona**

Shreve & Wiggins, **Vegetation & Flora of the Sonoran Desert**

—RGE

Dr. H. S. Gentry's long-time interest in the agricultural potential of jojoba was evidenced again when he consented to serve as consulting director for the field survey and germ plasm collection phases of the Interior Department's jojoba program. The program is sponsored by the Bureau of Indian Affairs through the University of Arizona at Tucson.

The Garden's Herbarium serves as field headquarters for the survey team and as a temporary deposition site for the superior germ plasm collections. When the continuing team member, L. McGill, completes field data evaluation and seed packet labeling, the collections will be distributed to research centers currently involved in agricultural production and improvement of jojoba.

Since 1972 the Garden has served as a center for dissemination of information in response to the growing interest in jojoba. Numerous visitors have come to see the jojoba shrubs we have growing here.

IN THE GIFT SHOP

Fine objects made of Desert Ironwood are always hard to find. We are happy to announce that we now have some beautiful ironwood boxes, bola ties, earrings and necklaces in the Garden's Shop — welcome news for collectors and connoisseurs of good craftsmanship. They are the work of Hugh S. Tudor II.

The boxes are each carved from a single piece of the handsome stone-hard wood, and polished to bring out the rich pattern of the grain. Some have subtle designs inlaid with turquoise or abalone shell.

The same skill that went into creating the boxes is apparent in the inlaid jewelry — sensitivity to the colors and graining of the wood, and meticulous care taken during the long and arduous task of shaping a material that is so hard it dulls all but diamond-tipped tools.

On your next visit to the Garden, be sure to see these additions to the gifts now available in the Shop.

Winter Care for House Plants

Have your house plants been neglected a bit during the holidays? Take a few minutes to clean them up and prepare them for the coming months. Cacti and other succulents should be moved to a south window, if possible, to get the best winter light. They should be watered much less during the cooler months to prevent rotting and etiolation. This dry period will also help induce flowering next spring.

Leafy plants should be taken outside — or to the shower if it's a chilly day — and washed off. Dust on leaves clogs pores and decreases the light reaching the plant. While they're outside, leach the soil to remove excessive salts (the crusty white layer on the soil surface or pot), and remove any yellow or dried leaves.

Back inside, put all your plants in the best light available. Mist them at least once a day or set them on trays filled with gravel and water. (Never let the water reach the bottom of the pot, or the soil will stay too moist.) Our indoor humidity is always low, but with heaters turned on it goes down even further and house plants suffer.

Poinsettias should always be given full sun or at least bright light. Remember they were grown in a greenhouse under almost perfect conditions, and our relatively dark, dry houses are difficult for them to adapt to. Keep their soil evenly moist and mist them regularly. When they begin to look scraggly, cut them back.

If you're buying new plants, pick those that can tolerate your particular growing conditions. No plant will grow for long in a dark room, but a few will tolerate low light intensities. **Aspidistra elatior**, the cast-iron plant; **Aglaonema** species, Chinese evergreen; **Scindapsus aureus**, pothos; and **Sansevieria trifasciata**, snake plant, are good choices for darker locations.

Try something different in a sunny spot. **Pandanus veitchii**, screw-pine, is a bold rosette of long shiny leaves. It needs good light but tolerates drafts and dryness. **Cissus rotundifolia**, the Arabian wax cissus, is a vine with thick round glossy leaves. It is related to grape ivy, **C. rhombifolia**, but is much easier to grow in our dry climate.

For more information on growing houseplants and to learn different kinds, sign up for our "House Plants for Phoenix" class at the Garden January 4-25.

—Sherry C. Krummen

Frost damage and How to Deal with it

by Russell Haughey

January is the coldest month of the year, and although it is easy to forget it here in Arizona, we usually have a number of freezes in the winter, most of them in January.

Some of your plants that may freeze this winter are Brittlebush, Lysiloma, newly planted trees and shrubs, seedling wildflowers, Elephant Tree, Coral Bean, some Cassias, and **Caesalpinia pulcherrima**, the red-flowered Bird of Paradise. Many succulents are susceptible to frost damage, too, such as Aloes, some Agaves, Gasteria, Sansevieria, **Portulaca afra**, some Crassulas, most cultivated Euphorbias, Kalanchoe, and some of the ice plants. Frost is a definite menace to some of the exotic cactus species and to such things as our native Organ Pipe, **Cereus thurberi**, the Mexican Organ Pipe, **C. marginatus**, and the Cardon, **C. pringlei.**

There are ways to minimize the problem when you plant your garden, as well as ways to protect your existing plants right now. The first thing I would suggest is to make sure you plant your tenderer plants in protected locations. This is easy to forget when you're putting plants in during warmer weather. Put them near south-facing and west-facing walls, sidewalks and driveways or large rocks which will store up heat during the

day and radiate it back at night. An overhanging porch or eaves, or an overhanging taller plant will help keep heat from radiating up past a tender plant.

The overall climate of a geographical area is called its macroclimate. Within the macroclimate, however, are natural and manmade conditions that modify it, and the small areas of modified climate are called microclimates. These little islands of warmer or colder temperatures can support different native or cultivated plants from those in nearby areas.

As you know, hot air rises and cold air sinks. On a cold night the cold air will drain off hills and flow down arroyos and gullies to settle in the lowest adjacent spots. Therefore, if you're lucky enough to have a yard with some contours, plant tender plants on the higher slopes so that cold winter air will drain away from them. If you live near a hill even this may not be enough. One of the advantages to living on one of the hills around Phoenix is that freezing is less of a problem, since cold air drains off the hill and settles in lower-lying areas of the Valley.

Keep these facts in mind next year when you add new plants to your garden or move some of the plants you now have.

But what can you do right now to prevent frost damage? First, hold back on watering. The new growth the extra water encourages is generally very frost-tender. Succulent plants that are turgid with water are most likely to freeze. This can create a dilemma — some succulents, Aloes especially, do most of their growing and flowering in winter here, and need some water — but if you give them water they may be more frost-tender. Decisons, decisions!

Heating cables can be laid on the ground around your more tender plants now and buried later when you have time. The cables are usually thermostatically controlled and can be set to turn on when temperatures get below the desirable level.

When a frost is forecast, most local gardeners rush out to cover their tender plants, but there are a few mistakes to avoid. Cover your plants with cardboard boxes, paper bags, burlap or old sheets, but try not to let the covering touch the tops of the plants. The contact point will have no protection from frost. A grower we know stuffs a sheet of crumpled newspaper in a bag to act as an insulating cushion. It works. Drape cloth over stakes, or even turn a garden chair upsidedown to act as a partial lid for radiating heat.

Never use plastic. It is worse than no protection. Moisture can condense under it and make a bad situation worse.

And remember to remove all the protection in the morning. Don't leave plants covered all day.

For enclosed patios and atriums, which can become dangerous wells of still cold air, you can run an electric fan all night and avoid the worst damage.

All of this sounds tedious, but it will save plants.

By Valentine's Day most of the danger of frost is over and it is time to start thinking about pruning off any damage you weren't able to prevent. Mid-March is a good time to do it. Don't prune off damaged branches until you are reasonably certain the last frost is over, for two reasons: the first is that damaged branches will help protect the rest of the plant from further freezing; the second reason is that when the sap begins to rise in the spring some of the branches you thought were dead will come back to life. Some bushes, such as the red Mexican Bird of Paradise, you may want to prune down to a stump in any case. They will grow back completely in one year and form a more handsomely-shaped specimen. Prune off all damaged Aloe and Agave leaves and clean up any other mess Jack Frost may have left.

To learn more about pruning, attend the workshop on pruning techniques and tools being held here at the Garden on Saturday, January 21st from nine to noon. The cost is $5.00 for members, $6.50 for non-members.

Inventory

(continued from page 5)

and the next day, according to plan, I made my way to the National Museum of Natural History of the Smithsonian Institution. Our National Herbarium is located on the fourth and fifth floors of the west wing of the gigantic building. There are over three million specimens in the two warehouse-like rooms, each about 150 by 200 feet, full of row after double row of tall herbarium cases. Deep in this maze they found a small table for me, but I had to be careful not to crack my elbows on the cases that hemmed me in on both sides. The regular staff has offices around the outside walls. Here I worked six or seven days a week until November 17th, except for the one Monday when I gave a seminar lecture at Beltsville and also had to change hotels.

The National Herbarium has the most complete collection of Agaves in the world, and I believe I looked at all of them, identifying, annotating, refiling many of them according to corrected names, and copying the label information from all wild specimens as well as many from European botanical gardens. I have not counted how many, but my notes from Washington and Missouri run to over seventy typed pages of citations and accompanying notations. It is all grist for the Agave monograph, which I will continue to put together in 1978.

This Agave inventory trip was all planned back in 1974 when we put together our last budgeted proposal for the National Science Foundation. In addition to collecting information for my own use, I left records of my revisionary work in annotations of specimens, which will be of primary use to future students. Most of my time was spent in a kind of clerk-like drudgery of copy work, but there were also new insights gained with the review of specimens, and the thrill when taxonomy or the relationships of species is clarified. I returned with the good feeling that goes with "mission accomplished." And now, who wants the job of helping to index all the citations, together with the rest of the specimens from our own and other herbaria?

—Howard Scott Gentry

Photographers — how about joining those Photographers of the Desert who are participating in the Garden's First Photographic Exhibition? The Cactus Show's photo section has been expanded into a big show in its own right, with black and white prints, color prints and transparencies of the Deserts of the World eligible.

Deadline for entries is January 7th, with judging on Saturday, January 14th at 9 a.m. Exhibitors and Garden Members are invited to the judging.

Non-Photographers — the Photographic Exhibition is for you, too. Requests for entry forms have already arrived from distant parts of this country and Canada, and indicate that we should have a very fine show of desert photography. The Exhibition will open January 28th and run through February 5th in the Garden's Auditorium, but a special preview showing for Garden Members will take place at 7 p.m. on Thursday, January 26th. Don't miss it.

For more information, phone the Garden at 947-2800.

Plant Sale Plants. It's early, but not too early, to give the Garden your surplus cactus and succulent cuttings that will again help the Garden raise funds during the Cactus Show and the Plant Sale. Even though the Cactus Show is in March and the Plant Sale is in April, if you donate your cuttings and seedlings now we will have time to pot them up and get them established before the sales begin.

Donors of plants for previous sales know this is a dandy way to thin out your own overgrown plants and aid the Garden at the same time.

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DESERT BOTANICAL GARDEN

MR. & MRS. RICHARD EDISON
1006 EAST REDMAN DRIVE
TEMPE, ARIZONA 85283

P.O. BOX 5415
PHOENIX, AZ. 85010

Garden Events

JANUARY

CACTOMANIACS meeting. January 3rd, 8 p.m.
HOUSEPLANTS FOR PHOENIX, A four-session class, January 4th, 11th, 18th and 25th, 2 p.m.
PUBLIC LECTURES, In the Garden's Auditorium, January 15th, 12th and 19th, 3 p.m.
MEMBERS' FIELD TRIP to First Water. January 14th, 8 a.m.
PRUNING WORKSHOP for desert gardeners. January 21st, 9 a.m. to noon.
MEMBERS' PREVIEW of the "Deserts of the World" Photography Show January 26th, 7 p.m. to 9 p.m.
PHOTOGRAPHY SHOW opens on January 28th and runs through February 5th, 9 a.m. to 5 p.m.
FIELD TRIP (open to the public) to Picacho Peak. January 28th, 8 a.m.

FEBRUARY

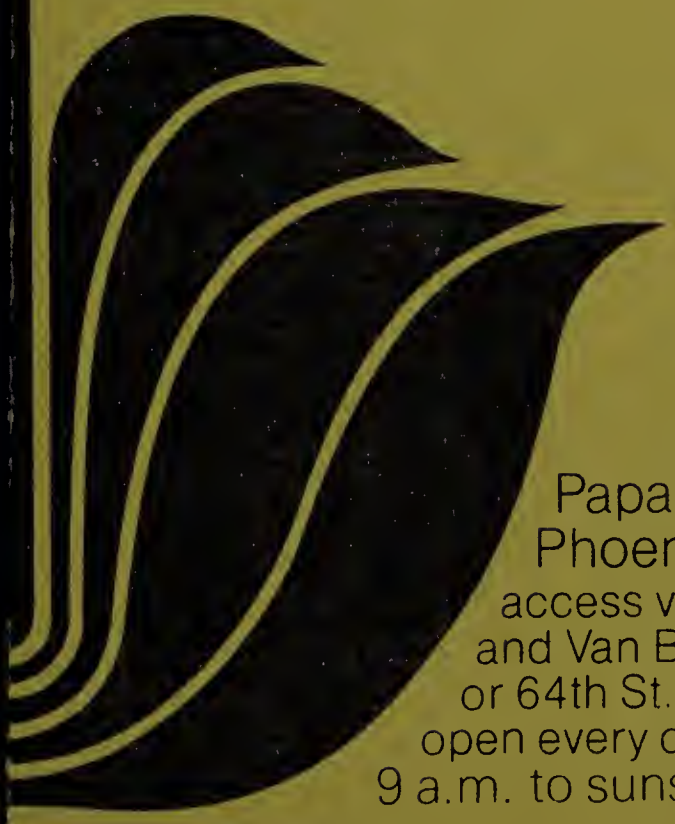
CACTOMANIACS meeting, February 7th, 8 p.m.
PUBLIC LECTURES, in the Auditorium, February 9th, 16th and 23rd, 3 p.m.
PLANT PROPAGATION WORKSHOP, Two sessions, February 9th at 6:30 p.m. and February 11th at 10 a.m.
MEMBERS' FIELD TRIP to Tonto Basin, February 11th, 8 a.m.
TERRARIUM AND DISH GARDEN WORKSHOP, February 15th, 9:30 a.m. to 2 p.m.
PLANT PROPAGATION WORKSHOP (repeat). February 16th at 6:30 p.m. and February 18th at 10 a.m.
DRIED FLOWER CRAFTS WORKSHOP, Two sessions, February 22nd and March 1st, 2 p.m.
FIELD TRIP (open to the public) to Hidden Canyon. February 25th at 8 a.m.

For class fees, field trip reservations and other information,
telephone 947-2800 or 946-9942

The Garden is open every day of the year from 9 a.m. to sunset.

Desert Botanical Garden

Calendar of Events Winter-Spring 1978



Papago Park,
Phoenix, Arizona
access via 58th St.
and Van Buren St.
or 64th St. and McDowell Rd.
open every day of the year
9 a.m. to sunset

A Non-Profit Incorporated Educational Society
for the Study of Desert Plants

1-78

DESERT BOTANICAL GARDEN
Calendar of Events for Winter & Spring 1978

The Desert Botanical Garden is open to the public every day of the year 9 a.m. to sunset. Admission to the Garden is $1.00 for adults, 50c for children from five to fifteen, no charge for children under five.

CLASSES & WORKSHOPS: Daytime and evening classes and workshops of one to six weeks duration are held during the year. Fees vary, and are listed in this calendar. Reservations are required since enrollment is limited.

FIELD TRIPS: The Garden schedules two field trips every month, one for Garden Members and their guests only, and one that is also open to the public. Prepaid reservations are required, but no reservations will be accepted more than three weeks in advance of the trip. Meet in the Garden's Webster Auditorium (take the service road). Departure promptly at 8 a.m., or earlier where noted in this calendar. Participants travel in their own cars — carpooling is encouraged.

The field trips have been rated according to difficulty. E means an easy trip, no climbing, less than a mile of hiking; M means moderate difficulty, little climbing, hiking under four miles; D means a difficult trip, hike up to 8 miles, some climbing. Leaders are familiar with trip sites and will have the authority to disqualify persons unlikely to make the trip in safety.

Wear comfortable, suitable shoes (lug soles recommended), bring water and a lunch that can be carried with you on the hike.

Note: From time to time additional classes, workshops and field trips may be arranged on short notice. If you wish to be placed on our mailing list for information about any of these, telephone the Garden at 947-2800.

FREE PUBLIC LECTURES are scheduled on most Thursdays in the Garden's Webster Auditorium at 3 p.m., November through April.

CACTOMANIACS, an informal group interested in desert plants and related subjects, meets on the first Tuesday of the month, October through May. Visitors are welcome.

The CENTRAL ARIZONA CACTUS & SUCCULENT SOCIETY, an affiliate of the national society, meets in the Garden at 2 p.m. on the last Sunday of each month during the entire year, except when outside events are planned. Visitors are invited to meetings, but should telephone the Garden to check the CAC&SS schedule.

For further information on any Garden event, telephone 947-2800.

DECEMBER

to Dec. 4	Continuation of "SPIRIT OF THE DESERT" ART SHOW. 9 a.m.-5 p.m.
8, 15, 22, 29	FREE PUBLIC LECTURES. 3 p.m.
6	CACTOMANIACS. 8 p.m.

8 WORKSHOP — DESERT CHRISTMAS DECORATIONS. Ideas and techniques using native materials. 1 Thursday session (bring lunch). Fees, including some materials: Members $5.00, non-members $7.00. 9:30 a.m.-2 p.m.

10 MEMBERS' FIELD TRIP — HORSESHOE DAM (Type: E) Fees: Members $1.00, guests $2.00. 8 a.m.

13- CLASS — FIELD IDENTIFICATION. An intermediate course in desert plant identification. 6 Tuesday sessions. Fees including books and hand lens: Members $10.00, non-members $13.00. 2 p.m.

15 WORKSHOP — DESERT CHRISTMAS DECORATIONS (Repeat of Dec. 8 workshop. See above). 9:30 a.m.-2 p.m.

17 FIELD TRIP (open to public) — McDOWELL MOUNTAINS (Type: E) Fees: Members $1.00, non-members, $2.00. 8 a.m.

JANUARY

5, 12, 19 FREE PUBLIC LECTURES. 3 p.m.

3 CACTOMANIACS. 8 p.m.

4 CLASS—HOUSE PLANTS FOR PHOENIX. Choosing and caring for indoor plants. 4 Wednesday sessions includes one trip to wholesale grower. Fees, including book: Members $10.00, non-members $12.00. 2 p.m.

14 MEMBERS' FIELD TRIP — FIRST WATER, SUPERSTITION MTS. (Type: M) Fees: Members $1.00, guests $2.00. 8 a.m.

21 WORKSHOP—PRUNING. Techniques and tools for keeping trees and shrubs looking their best. 1 Saturday session. Fees, including book: Members $5.00, non-members $6.50. 9 a.m.-noon

27 Members' Preview of the PHOTOGRAPHY SHOW. 7-9 p.m.

28 ANNUAL PHOTOGRAPHY SHOW. Theme — DESERTS OF THE WORLD. A juried show. January 28 through February 5. 9 a.m.-5 p.m.

28 FIELD TRIP (open to public) — PICACHO PEAK (Type: M) Fees: Members $1.00, non-members $2.00. 8 a.m.

FEBRUARY

to Feb. 5 Continuation of PHOTOGRAPHY SHOW. 9 a.m.-5 p.m.

9, 16, 23 FREE PUBLIC LECTURES. 3 p.m.

7 CACTOMANIACS. 8 p.m.

9 and 11 WORKSHOP—PROPAGATION. Learn to start new plants from seeds and cuttings. 1 Thursday evening session and 1 Saturday session. Fees, including seeds and cuttings: Members $7.50, non-members $10.00. Thursday 6:30 p.m., Saturday 10-12 a.m.

11 MEMBERS' FIELD TRIP — TONTO BASIN. (Type: E) Fees: Members $1.00, guests $2.00. 8 a.m.

15 WORKSHOP — TERRARIUMS AND DISH GARDENS Learn to design and maintain miniature gardens. 1 Wednesday session — bring a sack lunch. Fees, including all materials for 1 terrarium and 1 dish garden: Members $17.00, non-members $20.00. 9:30 a.m.-2 p.m.

16 and 18 WORKSHOP — PROPAGATION. (Repeat of Feb. 9 workshop. See above). Thursday 6:30 p.m., Saturday 10-12 a.m.

19-25	CHALLENGE OF THE ENVIRONMENT EXHIBIT by Girl Scout Cadets. 9 a.m.-5 p.m.
22	WORKSHOP — DRIED FLOWER CRAFTS. A beginners course in learning to preserve plant material and ideas for crafts using these. 2 Wednesday sessions. Fees, including some materials: Members $5.00, non-members $7.50. 2 p.m.
25	FIELD TRIP (open to public) — HIDDEN CANYON (Type: E) Fees: Members $1.00, non-members $2.00. 8 a.m.

MARCH

2, 23, 30	FREE PUBLIC LECTURES 3 p.m.
4	FIELD TRIP (open to public) — PERALTA CANYON (Type: M) Fees: Members $1.00, non-members $2.00. 8 a.m.
12-19	30TH ANNUAL CACTUS SHOW. Exhibits of specimen plants, dish gardens and arrangements. 9 a.m.-5 p.m.
25	MEMBERS' FIELD TRIP — CHERRY CREEK (Type: D) Fees: Members $1.00, guests $2.00. 8 a.m.
28	CLASS — WILDFLOWERS. A beginner's course in learning and growing Arizona's desert wildflowers. 3 Tuesday sessions including field trip. Fees, including book and seeds: Members $7.00, non-members $10.00. 2 p.m.
29	CLASS — WHAT IS A DESERT? An introduction to deserts, desert plant life, desert landscaping. 5 Wednesday sessions plus 1 field trip. Fees, including book: Members $12.00, non- members $15.00. 2 p.m.

APRIL

6, 20, 27	FREE PUBLIC LECTURES. 3 p.m.
3	WORKSHOP — DYEING WITH DESERT PLANTS Learn which are good dye plants, process them, dye different fibers. 4 Monday sessions. Fees: Members $12.00, non-members $15.00. 6:30 p.m.
4	CACTOMANIACS. 8 p.m.
8	MEMBERS' FIELD TRIP — WICKENBURG. (Type: E) Fees: Members $1.00, guests $2.00. 8 a.m.
14	Members Preview of ANNUAL SALE OF UNUSUAL PLANTS. 4 p.m.-Sunset
15-16	ANNUAL SALE OF UNUSUAL PLANTS FOR DESERT GARDENS. Hard-to-find and newly introduced trees and shrubs, cacti and other succulent plants. 9 a.m.-5 p.m.
18	CLASS—PRACTICAL DESERT GARDENING. Choosing, planting and caring for low-water, low-maintenance ornamentals. 4 Tuesday sessions. Fees, including book and plants: Members $12.00, non-members $15.00. 6 p.m.
20	CLASS — PLANT DRAWING FOR BEGINNERS. An outdoor class in how to look at and draw desert plants. 4 Thursday sessions. Fees, including basic materials: Members $7.50, non- members $10.00. 9:30 a.m.
20	CLASS — POISONOUS AND EDIBLE PLANTS. Learn identification of both types, their properties and uses. 3 Thursday evening sessions, plus 2 Saturday field trips. 7 p.m.
29	FIELD TRIP (open to public) — HUMBOLDT MOUNTAIN (Type: E) Fees: Members $1.00, non-members $2.00. 8 a.m.

MEMBERSHIP APPLICATION

Desert Botanical Garden
Box 5415, Phoenix, AZ 85010

Enclosed is my check for $_____. I wish to become a Member of the Desert Botanical Garden in the category checked below.

Mr.
Mrs.
Miss_____

Address_____

City_____ State_____ Zip_____

Annual Memberships: Individual, $15.00 ☐ **Family, $20.00** ☐ **Life Membership, $500.00** ☐
Sustaining, $50.00 ☐ **Benefactor, $100.00** ☐ **Patron Membership, $1,000.00** ☐

DESERT
BOTANICAL
GARDEN
PO BOX 5415
PHOENIX, AZ. 85010
(602) 947-2800

MAY

2 CACTOMANICAS — Potluck Supper. 6:30 p.m.

3 CLASS — FIELD IDENTIFICATION. An intermediate course in desert plant identification. 5 Wednesday sessions, plus 1 Saturday field trip. Fees, including books and hand lens: Members $10.00, non-members $13.00. 6 p.m.

5 WORKSHOP — TERRARIUMS AND DISH GARDENS. (Repeat of February 15 Workshop. See above). 9:30 a.m.-2 p.m.

13 MEMBERS' FIELD TRIP — SIERRA ANCHAS. (Type: M) Fees: Members $1.00, guests $2.00. 8 a.m.

25 WORKSHOP — USEFUL DESERT PLANTS. Learn identification and uses of some dye, fiber, medicinal and other plants. 2 Thursday sessions. Fees, including book and samples: Members $6.00, non- members $8.00. 6:30 p.m.

27 FIELD TRIP (open to public) — SYCAMORE CREEK (Type: E) Fees: Members $1.00, non-members $2.00. 8 a.m.

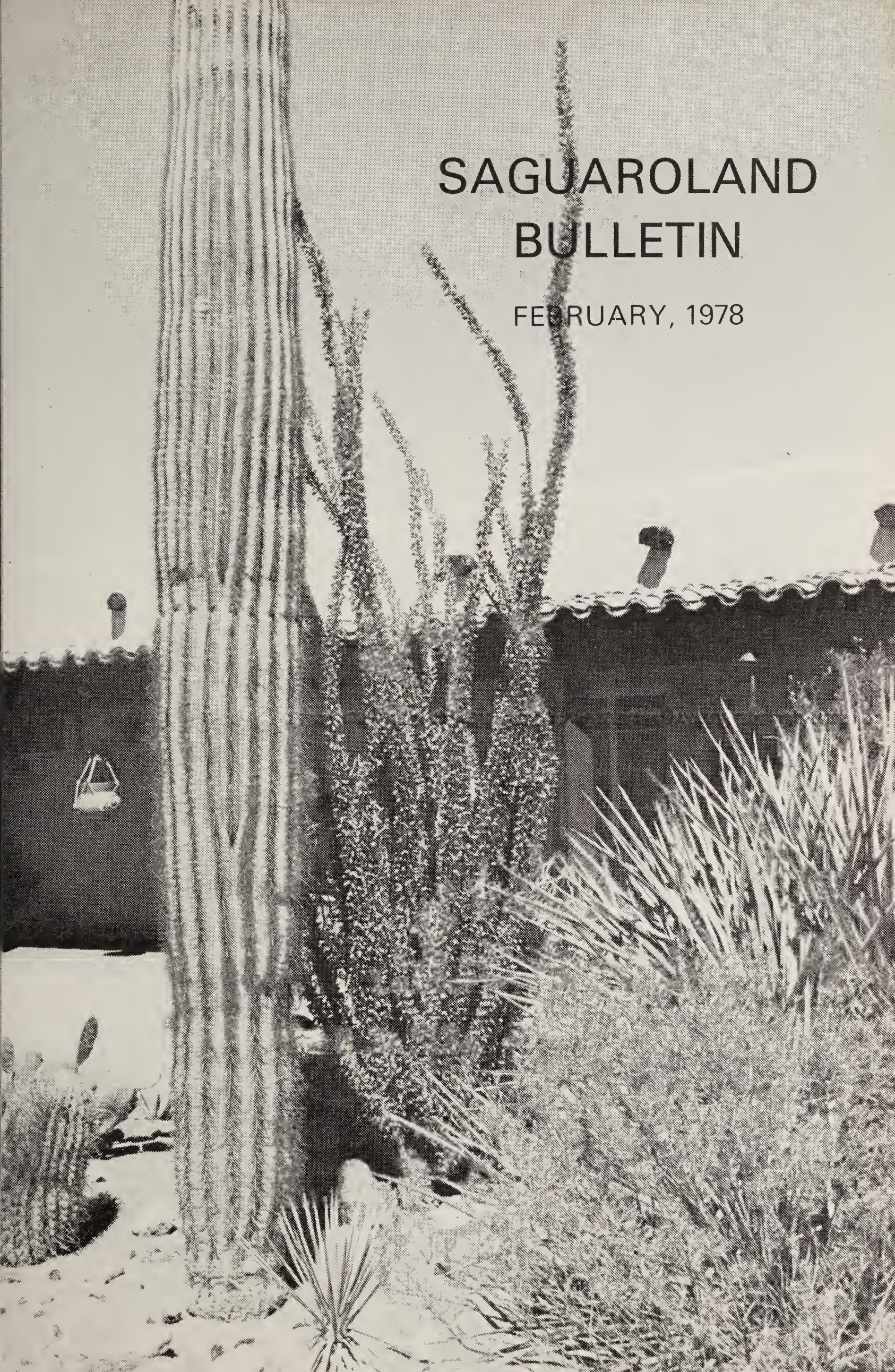
IN ADDITION — classes, workshops, field trips, lectures. Several of the day and evening classes will be repeated, and new ones will be introduced.

(The Summer-Fall Calendar of Events will appear in early June. For information on any event, telephone 947-2800).

DESERT BOTANICAL GARDEN
PO BOX 5415
PHOENIX, AZ 85010
(602) 947-2800

SAGUAROLAND BULLETIN

FEBRUARY, 1978



SAGUAROLAND BULLETIN Editor, Lillian Diven

FEBRUARY, 1978 Vol. XXXII No. 2

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Cover: In the Library patio (DBG photo)

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DESERT BOTANICAL GARDEN

ANNUAL MEMBERSHIP
Individual . . . . . $ 15.00
Family . . . . . $ 20.00
Sustaining . . . . . $ 50.00
Benefactor $100.00
Elementary or
High School . . . . . $ 3.00

LIFE MEMBERSHIP
$500.00

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$1,000.00

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Published and owned by the Arizona Cactus and Native Flora Society, sponsors of the Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. The Saguaroland Bulletin is published to disseminate information on the Garden and on desert plants and their culture. Issued 10 times a year.

ARIZONA CACTUS AND NATIVE FLORA SOCIETY

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News & Notes

The Garden's First Annual Photography Show was a conspicuous success, with the number and quality of the entries even higher than in past years when the photography exhibit was part of the annual Cactus Show. The long, detailed preparations for the Show were handled by Dorothy O'Rourke, Margaret Rosenbaum and their co-workers most professionally. Eighty exhibitors from the United States and Canada competed for the top prizes. The Show's title was "Deserts of the World", and drew entries of photographs of the Mojave, Colorado, Sonoran and Chihuahuan Deserts, as well as one Jordanian desert scene. Expanding show rules made it more interesting than ever before. All the participants are to be congratulated.

"Best in Show" trophies went to Emilio Binzoni in the Color Print Section, Bill Woodward in the Black & White Print Section, and to Sandra Thaw, APSA, in the Slides Section.

Winners of ribbons for color plant portraits were: 1st, Mike Hennessey, 2nd, Frank Bell, 3rd, Emilio Binzoni. For color landscapes: 1st, Emilio Binzoni, 2nd and 3rd, Bill Frank. For black & white plant portraits: 1st, Pieter Burggraaf, 2nd, Doug Bradley, 3rd, Bill Cramer. For black & white landscapes: 1st, Bill Woodward, 2nd, Pieter Burggraaf, 3rd, Bill Woodward. For slides, plant portraits: 1st, Alois Maag, 2nd, John Cacheris, 3rd, Marcia Bews. For slides, landscapes: 1st, Sandra Thaw, 2nd, Walter Groll, Sr. ARPS, 3rd, Mary Ann Beals. Honorable Mention ribbons were also awarded in all categories. A complete catalog of winners and exhibitors was printed.

There is a report on the Garden's first docent training program elsewhere in this issue. Suffice it to say here that Mrs. Krummen has trained an able, well-informed and enthusiastic group. We are pleased with the many skills and talents made available to the Garden by this training program.

It is with regret that we close these notes with sad news. A long-time member of the Board of Directors, and one of the original Members of the Garden, Lorraine McArthur Gilliland, died on December 29, 1977. Mrs. Gilliland served on the Board until early 1977. At that time, she retired with the title Board Member Emeritus bestowed on her by her fellow board members. The Garden has received several contributions in memory of Mrs. Gilliland, for which we thank her friends and ours.

Echinocereus triglochidiatus var. *melanacanthus*

For those of you who have waded through the long name, I congratulate you on your persistence, but from here on matters become much more complex than mere polysyllables.

Observers of cacti have a propensity to see and write of differences among cacti first and major unifying similarities second, if at all, and this results in nomenclatural problems. The triglochidiatus group of the Hedgehogs is a good example.

The group as a whole is comprised of six varieties, as interpreted by Lyman Benson in the third edition of Cacti of Arizona. Most, if not all, of these varieties have at one time or another been considered as separate species. This is not at all surprising considering that the plants frequently look quite different. For example, the number of stems per individual may vary from 500 in var. *melanacanthus* to only a few in individual plants in var. *triglochidiatus*. Length of stems may vary from 5 cm to 30 cm. Stem diameter within the group is even more remarkable — ranging from 3 to 25 cm. according to the literature. Ribs vary in number from 5 to 10. Spine color, number and arrangement vary to the same degree.

E. triglochidiatus var. *melanacanthus* in cultivation.

It is only by looking over the broadest geographic range of the plant and doing field work in the areas which lie between different "species" that one begins to find and recognize individuals and populations with subtle blending of characters which are not clearly assignable to either "species" exclusively and without hesitation.

For this and other reasons the elevation to species status has been questioned. Lyman Benson observes that "an evaluation can be made only by both extreme and intensive and long continued study in the field. Twenty-nine years of this has not produced the ultimate answers."

Distinctive morphological types have arisen in time through the process of mutation and the selective pressures on them by the environment. Isolation of populations by broad expanses of unsuitable habitat such as open desert, grassland or high mountains allows the development of geographic races which botanists call varieties, although the term is used somewhat loosely by the public and by some botanists. What unites varieties into a single species is their ability to cross freely in nature as well as in cultivation when the opportunity arises, the offspring of such unions being intermediate in character and fully fertile.

The variety *melanacanthus* of the Claret Cup Hedgehog has its distribution approximately centrally located with respect to the other named varieties. It occurs on canyon slopes, clefts in cliffs and rocky hillsides from 3,500 to almost 10,000 feet, mostly in the mountains of central Arizona. The variety also occurs in Nevada, Colorado, Utah, New Mexico, Texas, and in the Sierra Madre Occidental of Mexico as far south as Durango.

E. triglochidiatus var. *melanacanthus* is one of our most spectacular Hedgehogs. The number of heads in old plants is reported to reach 500. This I do not doubt, as I have seen the plant form great mounds in the area of Peeples Valley, Arizona, some as much as four feet in diameter and two feet high. The intense wine-red perianth of this plant is spectacular at any time, but when it occurs profusely on one of the mounds just described it can be awesome.

The 9-to-10 ribbed stems are light green and fleshy, 4 to 15 cm long, 8 cm being about the average length. The ribs are tuberculate, each prominence having 1 to 3 spreading or deflexed central spines. On the periphery of the areole are 5 to 11 radials, their length ranging from half that of the centrals to nearly the same length. Flowers are slender, being 3 to 7 cm long and up to 3.5 cm wide.

The plants I have seen tend to grow in rich organic soils or in relatively heavy clay types. The latter soil type may seem to contradict the normal "rules" for cactus cultivation, but the natural habitat, in most cases, combines heavy clay with a nearly vertical rocky hillside, so that near-perfect drainage is achieved.

This species is quite cold hardy in central Arizona. It does, however, require shading of the tender stems in the summer of low desert areas.

REFERENCES

Benson, Cacti of Arizona, 3rd Edition
Cactus & Succulent Journal, Vol. XXVII, No. 6, Nov.-Dec. 1955

—RGE

WELCOME DOCENTS

The first group of Desert Botanical Garden Docents had their graduation party on January 9th. Twenty-seven men and women completed the class, and their original six-weeks training class was extended to eight weeks by request of the Docents themselves in order to cover some material in more detail. The Docents now have a basic background in garden history, desert plant ecology, and cultural requirements of desert plants, as well as specific knowledge about many of the plants along the paths. Most have already led their first tours and the response has been enthusiastic.

In 1977 about 240 classes — a total of 8,000 children — visited the garden and we expect even more this year. Now the Docents will provide these groups with more information than the self-guided tour booklets they used in the past, will be able to answer questions on the spot and make sure our visitors don't miss those small details that make a trip exciting — a nesting dove or the first wildflowers of the season.

Besides guiding tours, many of the Docents are helping in other areas such as the bookshop, propagation, and special events. Some will help to develop new education programs.

Congratulations to our newly - graduated Docents: Irma Adams, Khrybel Amberg, Josselyn Bebee, Margie Bergen, Ross Berkheimer, Harriet Bonney, Elizabeth Cargill, Carrol Currie, Chet Groseclose, Mildred Hunt, Margaret Jenkins, Barbara Kaiser, Louis Kossuth, Vel Kossuth, Emmy LaTempa, Penny Matthew, Tomlyn McNabb, Sudie Odabashian, Genevieve Oppen, Dorothy O'Rourke, Jane Purtill, Joanne Renz, Nancy Rheinlander, Andrew Romanyak, Sarah Smith, Kay Starr and Marce Sterrett.

—SCK

Propagating Succulents by Cuttings

In propagation by cuttings, a portion of a stem or leaf is cut from the parent plant and placed under favorable conditions to form roots and top growth, thus forming a new plant. Cuttings are a popular way to propagate succulent plants for good reasons. A sizable plant can be grown faster from a cutting than from seed. Some succulents produce no seeds here, or few viable seeds, or the seeds are difficult to germinate — cuttings bypass this problem. The plant obtained from a cutting is identical to the parent plant, so there is no possibility of a hybrid occurring. And last, no special techniques or tools are needed.

In propagating cactus by stem cuttings, it is only necessary that a new root system be formed, since a potential shoot system — a bud — is already present in the areole. The development of adventitious or new roots is stimulated by several hormone-like substances. In some plants such as Opuntia, the Prickly Pears, all these growth regulators are present in the plant and a cutting roots quickly. In other plants one of them may be absent and rooting is slow and poor. Synthetic rooting hormones such as Rootone may be a great help in propagating such plants.

Most cacti can be grown from cuttings, although a few of our most common types are difficult, for example Ferocactus (Barrel Cactus) and Echinocactus (Wooly-headed Barrel). Many of the arborescent cacti such as *Cereus giganteus* (Saguaro) and Pachycereus (Cardon) are virtually impossible to root once tissue matures. Others, however, such as Lemaireocereus, the *Cereus pruinosus* group and Stetsonia are fairly easy to root, given time.

Cuttings should be taken from plants actively growing — but not in the flowering stage. Choose stems with relatively new growth but not those that are soft or rank-growing. Side branches will usually root better than the main stem.

When the stem is chosen, the actual techniques involved are simple. Make a straight, clean cut with a sharp knife or saw. Dust all cactus cuts with powdered sulfur. Euphorbia cuttings should be immediately dipped in cold water to coagulate the milky sap and stanch its flow. Cactus and Euphorbia cuttings should be left in a shaded, airy place until the cut has callused or dried thoroughly. This may take anywhere from two days to several weeks depending on the size of the cutting and the weather. Other succulents may be potted immediately. (A long stem can be cut into sections and each section rooted. If you do this, be sure to mark the top end of each section and pot them right-side-up, because an upside-down cutting won't root).

The soil mix for rooting needs to be heavy enough to hold the cutting in place and also porous enough to permit air to penetrate to the base of the cutting. At the Garden we use a mixture of one-third sand, one-third sifted decomposed granite, and one-third made from equal parts of perlite, vermiculite and compost or peat moss.

Cactus can be rooted directly in pots, or in flats or beds. Plant the cutting just deep enough to hold it upright and water lightly. Cactus will root if left totally dry, and this may be best in species tending to rot easily, but it usually is best to keep the soil mix slightly moist but never soggy. Some species with relatively long, thin stems may be placed horizontally on the soil mix. In this case, roots and shoots will often form along the whole length of the stem.

Heat is necessary for rooting, so work on cuttings should be done during the summer whenever possible. A heating cable placed under cuttings will help during cooler months. This is especially true of Euphorbias. Roots will usually begin to grow after about 4 weeks with the rooted cuttings ready for transplanting after about 8 weeks.

It is usually easiest to root cuttings in partial shade. If a cutting is destined for a

location in full sun, it should be partially shaded after transplanting and gradually exposed to the sun in order to prevent sunburn.

Plant propagation can be a very satisfying part of gardening or even a special hobby. You can learn much more about it if you sign up for the Propagation Workshop that will be taught by Victor Gass, the Garden's plant propagator. The workshop will be held at the Garden on Thursday, February 9th and Saturday the 11th, and will be repeated on Thursday, February 16th and Saturday the 18th. The Thursday sessions start at 6:30 p.m. and the Saturday sessions run from 10 a.m. to noon.

——SCK

OUR AUSTRALIAN SECTION

About fifteen years ago John H. Weber initiated a program of introducing Australian arid land plants into the collection of the Desert Botanical Garden. We have continued to expand this idea until at present we have an area of about seven acres allocated to Australian plants. Basically, this is a work area, and little of it is open to the public, but as certain plants mature the public area will be extended.

Australia has a large, diverse and unique flora which even today is not fully described and understood. Each of the Australian botanical journals to which we subscribe regularly has articles about new plants.

Immense areas of western and central Australia are desert or semi-arid plains, plateaus and isolated mountain ranges. It is in the flora of these areas that we are likely to find plants with ornamental potential and the physiological tolerance to withstand the rigors of Southern Arizona's climate. When one thinks of the flora of Australia one immediately thinks of Eucalyptus and of Acacias, known as Wattles "down under."

Charles Darwin, in his Voyage of the Beagle, had very uncomplimentary comments to make about these two ubiquitous taxa — he was also not much impressed by Australian society of the day. Today most people would regard his comments as decidedly unfair and one-sided.

Estimates of the number of Eucalyptus species range from 600 to over 900. In the Salt River Valley we commonly grow fewer than ten of them. Of those, most, such as *E. camaldulensis (rostrata), E. polyanthemos, E. rudis* and *E. torquata,* are the more phreatophytic types. The more xerophytic species are not available. This is not surprising considering that most of the Eucalyptus species introduced into the United States were introduced into the mesic coastal areas of California.

The same situation exists with the Australian Wattles. Of the estimated 500 species, only a dozen have been used in our area.

Other chiefly Australian plants extensively used in the Phoenix metropolitan area are *Cassia artemesioides, Casuarina cunninghamiana* (Beef wood), *Grevillea robusta* (Silk Oak), Melaleuca species, *Pittosporum phillyraeoides* and the Callistemons (Bottlebrush trees and shrubs).

Our horticultural flora tends to be an overflow of marginally-adapted species from California horticulture, in any case.

Instead of continuing to add Australian plants to Arizona's horticultural flora in a casual, almost accidental, way, the Desert Botanical Garden has first sought accurate botanical and habitat information on possible test species, in order to narrow its selection to attractive trees, shrubs and other plants that are pre-adapted to our own varied local horticultural environments.

In our Australian Section we are currently testing drought and cold tolerances of Eucalyptus, Grevillea, Acacia, Cassia, Dodonea, Callistemon and Melaleuca species new

to the valley. Next, an evaluation of their ornamental potential will be made. If we are satisfied with the results of all these tests we will then try to propagate them from cuttings or seed for distribution to our members, nurserymen and other botanical garden institutions around the world.

One species which we expect to establish successfully in the local trade is *Dodonea microzyga. Dodonea micrazyga* is a Hop-Bush with small, waxy leaves. The remarkable feature of the plant is the winged maroon fruits that cover it in the spring. During our Cactus Show last year many people remarked on the beauty of this particular plant and wanted to know where they could buy one, so we already know it will be welcomed.

Already established in horticulture is *Dodonea viscosa*, native to Australia, North America and Africa. A purple cultivar from Australia is also in the trade, but is considered less cold-hardy than our native strains. Australia has almost 70 Dodonea species to be or being investigated. Some of the Wattles (Acacia) also promise to be effective garden plants.

All of the plants in the newest part of the Australian Section are on a drip irrigation system. All we have to do to water the whole section is to turn on the water once a week. But things are never quite so simple. Some of the plants could use more water than others, but they all receive the same amount. (We also had a problem with coyotes chewing through the hoses and pulling out the emitters, trying to get at the water, but this was solved by putting wire netting around the emitters.) As we continue work in this section, we are accumulating useful watering data on the plants.

The seed for these plants came from various sources. Most of it, however, came through our seed exchange program with the various Australian botanical gardens.

The new Australian Section is located east of the older cultivated part of the Garden, near the bike path which parallels the canal at the eastern boundary of the Garden. Future plans for this section will probably include the bike path. The Australian Section will have a large open area for Australian wildflowers such as Sturt's Pea *(Clianthus formosus)*, which we've already grown, and different species in the Anigozanthus genus, "Kangaroo Paws", a genus that should be very attractive. We will also be trying out hundreds of different species of other wildflowers for their suitability to our climate and their worth as ornamentals.

We invite Members to come in and evaluate these plants for themselves. Their opinions will help us estimate public reaction to specific plants.

—RGE & RAH

PLANT SALE PLANTS — Donations of surplus cactus and succulent cuttings and seedlings have begun to come in from Members — thank you. Of course, we can use many more both for the Cactus Show sale and the Annual Plant Sale where we raise funds for the Garden. The sooner we get them, the sooner we can pot them up. Staff, docents and other volunteers are doing the potting and labelling, and their work will go more quickly if you identify the plants you give.

FIELD TRIP RESERVATIONS — a change in rules. For the rest of this spring's field trips, reservations will be accepted immediately, so Members may now sign up for March, April and May trips without waiting until three weeks before the field trip date. Spring trips are popular ones, so it would be wise to get your reservations made and paid for soon.

BELLY FLOWERS—Part 1

DESERT STAR

As spring approaches, most of us look forward to large splashes of poppies and lupines that add sudden color to the desert. But this spring, why not think small?

For a change, concentrate on the miniature desert wildflowers that are usually overlooked. When you refocus your eyes to see small plants, you'll see more than you thought possible. Not only more kinds of wildflowers, but more fascinating details and shapes. There's a feeling of discovery when you spot an inch-high flower that was invisible five yards away. You'll get more pleasure out of a quarter acre of the desert this year than you did out of ten acres last year.

The reason the smallest desert wildflowers are called Belly Flowers is obvious. You have to get close to them to appreciate them, and the only way to do that is to get down to their level — flat on your belly. This requires a certain agility, old clothes, and a lack of concern about how silly you look sprawled on the ground, but it's worth it. Get down there and enjoy.

There are species of belly flowers in a number of genera, and we'll cover more in the next issue of the Bulletin, but let's look at three different daisies here, since they're very pretty little things, relatively common, and — like many composites — a little hard to tell apart.

Monoptilon bellioides, called Desert Star or Rock Daisy, is seldom more than two inches tall. Its stems spread and curve up, forming a flower-topped mat that can be as much as six inches across, though it's not uncommon to find a flowering plant no broader than a silver dollar and bearing only two or three flowers. The centers are yellow — so are the centers of the two others — and the rays are white to pinkish — so are the Pygmy Daisy's — so how do you tell which is which?

First, count the rays. The average *M. bellioides* flower has more than ten rays, commonly about fifteen, and possibly as many as twenty or more. Next, check their color. We've found that the rays of the Desert Star are more often pinkish than whitish, and often a pink that's close to lavender. But whether they're white or pink, they have a silky sheen that is absent in the rays of the other two. The somewhat hairy narrow leaves appear in tight clusters beneath the flower.

Desert Star is found throughout Arizona, in Southern California and in Sonora, Mexico, at elevations lower than 3,500 feet, blooming from February through April.

Pygmy Daisy is *Eriophyllum lanosum. Lanosum* means woolly, and the leaves and stems have a thicker coating of hairs than those of the Desert Star, which may be a help in identification. Another dif-

DESERT STAR

PYGMY DAISY

ference is the tendency of the reddish stems to sprawl rather than curve upward, but the most noticeable difference is in the number and shape of the rays. Pygmy Daisy has fewer rays — usually five to ten — and the tip of each ray is toothed, instead of rounded. The rays' color is more often white than pinkish, although their undersurfaces have fine red veins. The narrow leaves appear along the stems, not in clusters, and plants may grow somewhat taller than typical Monoptilons.

Eriophyllum lanosum is found in roughly the same areas and elevations as *Monoptilon bellioides*, but *Dyssodia concinna* is restricted to southern Arizona and Sonora. If you're hunting for belly flowers in that area where all three occur, here is what distinguished *D. concinna* from the other two.

This one smells. "Dyssodia" means "disagreeable smell", and members of the genus all have strongly aromatic foliage. Besides that, *D. concinna* foliage is neither hairy nor woolly, and the leaves are cleft into narrow lobes.

Though similar in height to the other two, it looks a bit more wiry. The rays are always white, and they number about the same as the Pygmy Daisy's, but the tips are rounded, not toothed. Another difference is that in this plant the flower

DYSSODIA

L: Pygmy Daisy with toothed rays.
R: Dyssodia rays have round tips.

heads cluster at the summits of leafy branches — in the other two you'll find one flower per stem.

Briefly, these are the "field marks" of the three miniature daisies: Desert Star has the most rays, is more likely to be pinkish, and the leaves cluster beneath the flowers. Pygmy Daisy has 5 to 10 rays, and they're toothed. Look for red on stems and underneath rays. Dyssodia smells, has 5 to 10 round-tipped white rays, and the branches are leafy.

Having mastered these three tricky composites, limbered up your knees and prayed for a good spring, you are now ready to go belly-flower-hunting.

Next month we'll talk about more of the small stuff, and promise that they'll all be easy to identify.

——LD

A New Brand of Gasoline*

(For your amusement, a 1938 "imminent solution" to a problem the world is still trying to solve.)

One of the major problems in Italy's recently conquered province of Ethiopia is fuel for motor cars. The need for gasoline is urgent as almost all transportation is dependent upon motor cars and because all motor fuels have to be imported at extremely high prices. During the subjugation of 1935, an oil company entered into a contract with Haile Selassie for all oil rights in that country. This gave the Italians wild expectations of an unlimited supply of crude oil, but these dreams have not materialized, ardent though the search has been.

Alcohol, the substitute for gasoline, can be made from palm nuts, corn and millet which are available in sufficient quantities to produce an estimated one million gallons per year, but petroleum is best and most desirable as a motor fuel and so far the country has produced none.

By this time the reader will perhaps be wondering what all this has to do with succulents, but the unusual association is that the Italian Fuel Commission announces that the best assurance now appears to be in the billions of weird cactoid Euphorbias that grow throughout that country. The latex of the large tree-like species is said to yield approximately 60 per cent of a gasoline-like liquid which can be produced by a simple chemical treatment at little expense, and today this "vegetable gasoline" holds out an encouraging hope to the worried Italian engineers. The Italian Fuel Commission is at least going to try it out and are now arranging for the construction of a Euphorbia gasoline refinery at Agodat, which is the center of the large Euphorbia forests and on the main highway to Addis Ababa where fuel-hungry fleets of trucks pass every day on their trips to the sea.

The entire experiment will be watched with interest since geologists inform us that the world's petroleum supply is limited and diminishing rapidly, and who knows but that the answer rests with the Euphorbiae.

—G.A.Frick

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DESERT BOTANICAL GARDEN

P.O. BOX 5415
PHOENIX, AZ. 85010

Garden Events

FEBRUARY

CACTOMANIACS meeting, February 7th, 8 p.m.
PUBLIC LECTURES, in the Auditorium, February 9th, 16th and 23rd, 3 p.m.
PLANT PROPAGATION WORKSHOP, Two sessions, February 9th at 6:30 p.m. and February 11th at 10 a.m.
MEMBERS' FIELD TRIP to Tonto Basin, February 11th, 8 a.m.
TERRARIUM AND DISH GARDEN WORKSHOP, February 15th, 9:30 a.m. to 2 p.m.
PLANT PROPAGATION WORKSHOP (repeat). February 16th at 6:30 p.m. and February 18th at 10 a.m.
DRIED FLOWER CRAFTS WORKSHOP, Two sessions, February 22nd and March 1st, 2 p.m.
FIELD TRIP (open to the public) to Hidden Canyon. February 25th at 8 a.m.

MARCH

PUBLIC LECTURES, in the Garden's Auditorium, March 2nd, 23rd and 30th, 2 p.m.
FIELD TRIP (open to the public) to Peralta Canyon, March 4th, 8 a.m.
31ST ANNUAL CACTUS SHOW, March 12th through March 19th, 9 a.m. to 7 p.m.
MEMBERS' FIELD TRIP to Cherry Creek, 8 a.m.
WILDFLOWERS CLASS, identifying and growing them. For beginners. Three Tuesday sessions include field trip. Starts March 28th, 2 p.m.
WHAT IS A DESERT? Introductory class covering deserts, desert plant life and desert landscaping. 5 Wednesday sessions and a field trip. Starts March 29th, 2 p.m.

For class fees, field trip reservations and other information,
telephone 947-2800 or 946-9942

The Garden is open every day of the year from 9 a.m. to sunset.

SAGUAROLAND BULLETIN

MARCH, 1978

SAGUAROLAND BULLETIN — Editor, Lillian Diven

MARCH, 1978 — Vol. XXXII — No. 3

DESERT BOTANICAL GARDEN

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Cover: Fruit of *Rathbunia alamosensis*
(DBG photo)

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Published and owned by the Arizona Cactus and Native Flora Society, sponsors of the Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. The Saguaroland Bulletin is published to disseminate information on the Garden and on desert plants and their culture. Issued 10 times a year.

ARIZONA CACTUS AND NATIVE FLORA SOCIETY

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News & Notes

This year looks fair to good for wildflowers. The rains and relatively warm weather in January have greatly improved the chances of having a good spring wildflower season. If drying winds don't kill them, the thousands of poppies now up in the Picacho Peak area and lupines along the Pinal Pioneer Parkway should make an impressive display in late February and March. If rains come in February they would guarantee an "Arizona Highways" spring.

Those sixty or so members and guests who made it to the **Deserts of the World** photo show opening were rewarded by the most spectacular and beautiful photo show ever staged at the Desert Botanical Garden. Visitors and exhibitors were very appreciative of the much enlarged scale and facilities of the show. Entries depicting the deserts of Chihuahua, Jordan, Colorado and New Mexico were particularly significant in broadening the range of the show.

As one show closes, another is close on its heels. Yes, the Cactus Show is already in gear. Elsewhere in this bulletin we make our yearly appeal for help in preparing and manning this, our most attended event of the year. Please come in and apply your time and talents to this most worthwhile event. If you've never helped before, now is your chance to meet and work with other members of the Garden and staff who share in the support of the Garden.

For the Annual Meeting of Garden Members on May 21, 1978 the staff and docents are planning a "behind the scenes" tour of the Garden for Members only. This will be in addition to the regular business of reports on last year's doings and next year's plans. For the first time, Members will get to see the propagation area, the Australian section, and many other parts of the Garden closed to the public. It will be a chance to see how the Garden works and we think it is an exciting idea.

Whether you approve or disapprove of the use of metric units in your everyday life, metrics are and have been a way of life in the scientific community for many generations. With easing this difficult change in mind, we are, with this bulletin and each subsequent one, printing a metric scale in the back of each issue.

BELLY FLOWERS—Part II

Last month we suggested that you concentrate on desert Belly Flowers this spring, the miniatures under four inches tall. There are more of them than you've realized if you just looked for the flamboyant wildflowers in the past.

Granted, a person of any size looks undignified stretched out prone on the desert floor with his nose inches from a pygmy wildflower, especially if he's examining it with a magnifying glass, but that's the way to see belly flowers, and they're worth it.

To enjoy the great variety of miniature desert wildflowers, a magnifying glass is useful, flexible knees are convenient, but the most important thing is to move slowly and look down. If an inch-high plant has a half-inch flower, you won't see it if you march briskly through the desert.

Here are four of the desert wildflowers you're likely to see this spring if you slow down, look down and get down.

The Bristly Forget-me-not is shown here in its natural size. It's a fuzzy, compact wildflower with minute white flowers almost hidden by the whitish bristles. In fact, the botanical name *Cryptantha barbigera* — meaning hidden-flower, bearded — exactly describes its appearance. With your hand lens you can see that the tiny flowers, ⅛ inch wide — or about 3 mm — see the metric rule in this issue), are the familiar forget-me-not shape. Bristly Forget-me-not is quite common in the creosote bush desert. It is an attractive little plant, but the sharp, stiff bristles on the leaves and stems make it a bit uncomfortable to handle.

BRISTLY FORGET-ME-NOT

A similar, but larger member of the same Borage Family is the Popcorn Flower, *Plagiobothrys arizonica,* too tall to qualify as a belly flower. Its flowers are much larger and less hidden, and the leaves are considerably bigger.

In a very dry year you might come across a mature, flowering *Nama demissum* that has one small cluster of leaves and a single bell-shaped purple-red flower, but normally this plant lives up to its name, Purple Mat. On the dry sandy desert flats it is an exceptionally attractive soft green mat of leaves with numerous vivid flowers clustered in the leaf axils. This is a prostrate annual wildflower that spreads sometimes to eight inches in diameter but is never taller than an inch or two. Because the plant hugs the ground, the half-inch flowers are more conspicuous than they would be on a taller plant. Purple Mat's narrow leaves form a basal rosette and cluster at the ends of the stems. This is a rather common wildflower in sandy desert soils in western Arizona at elevations under 3500 feet, and blooms in March and April.

Purple Mat is a very photogenic belly flower. If you have a close-up lens for your camera, you'll use it a lot this spring. A slide of a very small flower projected on a very big screen is nothing short of sensational.

Filaree is another photogenic plant, although its pink-purple flowers are small. The downy, multi-lobed leaves, the red stems, and the five-petalled flowers

PURPLEMAT

combine to make a good subject for your camera.

Filaree, *Erodium cicutarium,* is one of our most abundant spring wildflowers, and one that is prized by ranchers. It is so widespread in Arizona that most people assume it's a native, but it's not. The Spanish brought it to the Southwest long ago from Spain as a forage plant for their herds of cattle. The long, beaked fruits of Filaree are responsible for its other name, Heronbill.

When the fruits dry, the long thin "tail" on the seed twists into a tight spiral that untwists when it gets moisture. You can watch it happen if you pick a seed, lick it, and hold it in your palm. In a matter of seconds the spiral begins to unwind. This intriguing mechanism has a practical use. As rain touches the dry spirals, they unwind and drive the seed into the soil like a ground auger.

In eastern Arizona you might come across the native *Erodium texanum,* with leaves that look more like a geranium's, but it is much less common than the imported Filaree.

Trailing Four-o'clock, *Allionia incarnata,* ranks as a belly flower even though the stems can be quite long. It spreads across sandy soil, and its sticky stems are usually coated with clinging grains of sand.

This is a Four-o'clock that doesn't behave like one. The bright red-purple flowers open in the morning, not in the afternoon. Individual flowers are approximately a half-inch in diameter, but they appear larger because they are grouped in clusters of three that are sometimes mistaken for a single flower.

FILAREE

Allionia incarnata is a common late-spring flower in the desert and a summer wildflower at higher elevations in Arizona.

The prospects for good spring wildflowering this year are very good. We may even have the masses of poppies and lupines that we've missed in recent years. Enjoy them, of course, but don't forget to think small and look at the belly flowers, too.

——LD

Drawings by Christina Dezelsky

TRAILING FOUR-O'CLOCK

The Visitors' Book

The lines in the Garden's visitors' book are filled rapidly during the winter months when Arizona draws travellers from this country, Canada and abroad. There's a space for comments after signatures, and though most comments are predictable — "educational", "interesting", "worthwhile" (it's hard to think of something different) — some people do come up with different comments.

There have been several comments in Japanese which we trust are complimentary, and in German, Russian and Spanish which do say nice things. One couple from the midwest were unhappy. They wrote "We shouldn't have to pay to see this", but later that day a man from Connecticut wrote "I disagree with them!" And two other visitors wrote "So do we!" The only other unhappy comment was "boreing", but the handwriting and the spelling suggest a rebellious ten-year-old tagging after Mom and Dad. He has our sympathy.

The whole staff gets a lift from written compliments: "groundspeople should be commended", "beautifully presented", "enjoyed the displays", and especially the remark from a man who identified himself as a horticulturist from back East, "one of the best gardens I've seen". One of the nicest comments was simply "thank you".

But the lines that show the Garden is really doing what it was meant to do are those written by visitors who have seen the desert for the first time and find it fascinating. The Minnesotans who wrote "a new world for us!" The Marylander who wrote "My second visit in three days – fantastic!" The Canadians who "fell in love with the desert", the people from Uruguay, Turkey, Australia, New Zealand who learned here that "desert" doesn't mean empty, wasted space.

? ? ? ? ? ? ?

a. Cochineal bugs.
b. It needs more light.
c. Nothing you can do.
d. March and April.
e. No, thank you.

Next to "Nine a.m. to sunset, every day of the year" these are the answers to the commonest questions people ask us on the phone. The Garden staff doesn't keep a tally of the calls that come in — a minimum of ten a day would bring one year's total to 2600 phone calls! — but just read the answers off to people who work at the Garden and they'll recite the questions word for word.

You can probably figure the questions out by yourself, but if you can't, here they are, out of order, to match up with the answers. 1. When is the desert in bloom? 2. There's white fuzz all over my prickly pears. 3. My saguaro is rotting. 4. Will you come and dig up my big century plant? 5. My potted cactus is growing pale and skinny.

(Absolutely no prizes awarded for correct solutions.)

So You Want to Change to a Desert Yard,
or
How to Kill Your Bermuda Grass

The easiest way to get rid of your bermuda grass is to move to a house without a lawn.

Bermuda grass (*Cynadon dactylon*), which is a native of Australia (not Bermuda), is the most commonly planted lawn grass, and is also considered by some to be a weed.

If it is not practical to move, you might want to attempt the second easiest method — the black plastic method.

STEP 1: Take off the top four inches of soil, Bermuda grass and other grasses, using a shovel, wheelbarrow and pickup truck, and haul the soil to the dump. Soon you will realize how much work you are faced with and may want to rent a small tractor for sixty to one hundred dollars a day.

STEP 2: Lay down some black plastic sheeting over your yard. This is to keep light from reaching the little Bermuda grass suckers that are surely remaining in the soil.

STEP 3: Have a few truckloads of decomposed granite brought in and dumped on the plastic. Spread around the granite.

STEP 4: Now you can cut through the plastic and plant your desert plant.

STEP 5: Use a strong contact herbicide such as Doomsday or Roundup to kill any Bermuda grass that comes up through the holes you put in the plastic. You will probably have to keep after the Bermuda grass for a few years.

The black plastic method is quick, but it has its drawbacks. First, the plastic will keep water from getting to the roots of existing plants. Second, water may seep in under the plastic from your neighbor's irrigation. This water will be trapped under the plastic and will be great for all sorts of fungus which could kill everything in your yard. Third, any Bermuda grass suckers that are left alive will find their way to the openings in the plastic and come up around all your cactus (I have seen Bermuda grass growing through a saguaro and coming out an areole). Lastly, this plastic decays in our desert heat and bright sunshine, and will appear on the surface in little torn bits when the granite gets washed away.

The black plastic method has so many drawbacks that you may want to use the herbicide method. This might be a little more work, but it will do a better job if you are thorough.

STEP 1: The best time of year to do this is late spring or summer when the grass is healthiest. Water it well for a few months before you plan to kill it, because the healthier the grass is the quicker it will absorb the herbicide.

The reason Bermuda grass is so hard to kill is that it has three methods of propagating itself — seed, stolons and rhizomes. Stolons are suckers that crawl along the surface of the soil and take root, starting new plants. Rhizomes are suckers that move through the soil, starting a new plant when they break the surface.

The first application of a contact herbicide such as Doomsday or Roundup will kill most of the Bermuda grass on the surface, including the stolons. The rhizomes that haven't yet appeared on the surfact won't be affected.

So, two to three weeks after the first application, spray again to get any grass that is still living, and the newly emerged rhizomes. Continue spraying at two to three week intervals until there is no new grass coming up.

Be sure you get all the grass that is protected by rocks, other plants, etc. and be sure to shield any other plants that you don't want killed, because just a little bit of contact herbicide on a green part of a plant may kill it. If you accidentally spray a branch, you

may save the plant by pruning off the branch within one hour. Be sure you read the directions carefully.

STEP 2: After you have sprayed your yard two or three times and are certain all the grass is dead, remove the top two to four inches of soil to get rid of all the dead grass. You could skimp here and just remove the dead grass, but the extra effort is worth it.

STEP 3: Bring in your new top dressing of granite. You may want to mix the granite with sand half and half for better drainage.

STEP 4: Plant whatever you want — without the problems of Bermuda grass or black plastic.

The last step: Keep after the Bermuda grass that may come back in the next few years.

As you can see it is not easy to get rid of a Bermuda grass lawn, but if you don't take any shortcuts, do a good job, and don't let Bermuda grass get started again, you can definitely have a desert yard.

Another suggestion: When you take out the grass, lay brick or flagstone for a nice big patio, build a fire pit or a barbecue, and you can spend cool evenings outside cooking steaks with some good friends.

—R.A. Haughey

Cactus Show Volunteers

The Cactus Show is nearly here — March 12 through March 19. Here's a Volunteers' Check List. You know by now how much your help is needed! Will you phone and let us know what jobs you'll do now and during the Show?

( ) Pre-Show mailings
( ) Typing
( ) Filing
( ) Sales in Shop
( ) Selling Nature Walks
( ) Restocking in the Shop
( ) Registering entries before Show
( ) Mailing, stuffing envelopes
( ) Tabulating the Show
( ) Listing entries, exhibitors
( ) Figuring totals during Show
( ) Helping set up Show
( ) Acting as host, hostess
( ) Being guard or 'traffic cop'
( ) Helping with publicity
( ) Keeping attendance count
( ) Answering visitors' questions
( ) Lettering, posters, etc.
( ) Distributing posters
( ) Handling phone calls
( ) Miscellaneous chores
( ) Running errands.
( ) Anything at all!

How many days a week? On weekends? An occasional evening? When? Now? During the Show? After? Call 947-2800.

For the Show Week plant sale, we need Volunteers right now to put up plants, to donate extra cactus and succulents from their gardens, to contribute fresh and (accurately) named cactus seeds, and to gather these things for the sale: shopping bags and smaller ones, clay and plastic pots, yogurt containers and the like, and small boxes. Please bring them to the Garden.

Ariocarpus kotschubeyanus

All of the known species of Ariocarpus inhabit the Chihuahuan Desert of Mexico and Texas. This area is characterized by a summer rainy season, dry winters, and limestone or limestone-derived soils. The soil is extremely porous. Plants of this region generally grown during the rainy season with flowering immediately preceding it or immediately following it.

Ariocarpus are named after the characters of the fruit (carpus), which Scheidweiler thought resembled the fruit of the genus *Aria* of the Rosaceae, subsequently placed in the genus *Sorbus*. The fruits are small scaleless or few-scaled berries, much like *Mammilaria* fruits, buried in the wool at the apex (growing center) of these plants.

All Ariocarpus species mimic their surroundings in color, texture and form to some extent, hence the common name "Living Rock." This little dwarf goes a step further in its cryptic performance by often actually hiding beneath the substrate. It is usually found in cracked, parched silt of dry lake beds in north central Mexico. During heavy rains its lakebed habitats flood with run-off from the surrounding hills. As the water evaporates and penetrates the soils of these habitats the fine particles of soil suspended in the run-off settle on the pancake-flat surface of the plants.

Ariocarpus kotschoubeyanus received its specific epithet in honor of "the princeling who gave a thousand francs" for one of the first three plants to arrive in Europe in about 1840. A thousand francs at the time was worth slightly in excess of the plant's weight in gold. The plant is still very highly regarded by collectors and is unfortunately not propagated to any extent, with the result that collection from the wild is still practiced.

This is the smallest of all the "living-rock" cactus, the rosette of tightly packed, grooved triangular tubercles being only 3

A. kotschubeyanus flowering at the Garden in October, 1977.

to 5 cm broad. It is only the faint symmetrical outline of these tubercles lying flush with the surface of the ground which makes the plant perceptible in its habitat when not in flower. The pointed triangular outlines of these tubercles, with a wooly areole cleft down the center, also gives the plant one of its common Mexican names, *pata* or *pezuna de venado,* which translates as hoof or foot of the deer. Another common name applied mostly to other members of the genus is "Chaute", an Indian name for glue. This name arises from the thick mucilaginous and nearly opaque, whitish (not milky) sap, which is extruded with considerable force at even the slightest injury to the underground stem. It is probably this excessive bleeding at the time of careless collection which leads many of these plants to an early death.

The rosette is attached to a thick, slightly fusiform rootstock or subterranean stem which in turn has a few short, thick roots protruding from its underground terminus.

Ariocarpus kotchschoubeyanus flowers are up to 3.5 cm broad. They are magenta

or occasionally white. It is not unusual to see two or even three flowers opening at the same time on two or three successive days in the fall. When this occurs, the tiny rosette is totally obscured. Flowering season is therefore the ideal time to find this cactus in the field.

An even smaller Ariocarpus is the var. *McDowellii of kotschoubeyanus* which is found in Tamaulipas. Other than the size it is much the same, although some authors elevate it to species rank.

Cultivation is reportedly difficult, although several authors and our experience would indicate little difficulty. A porous limey soil with a little organic matter in it and a pot deep enough to accommodate the long thickened root are all that the plant requires besides careful and timely watering. Watering should be done in the summer, but carefully. The woolly areoles will absorb water if the plants are allowed to remain submerged for any length of time. Our high summer air temperatures coupled with this will quickly encourage rot. Therefore, try not to wet the woolly portions of the plant. Do not water in the winter.

The plants appear to flower best in pots at the Desert Botanical Garden and are, in any case, easier to give specialized care if left potted.

REFERENCES:

L. H. Bailey, Cyclopedia of Horticulture, Vol I.

Britton & Rose, Cactaceae, Vol. III; *Cactus & Succulent Journal,* Vol. XVIII; XXX; IX; XXXVI; XLVI; XLVII.

Standley, *Trees and Shrubs of Mexico,* Vol. IV.

——RGE

ACCESSIONS RECORDS

Just what are those little numbered aluminum strips stuck in the ground beside all the plants in the Garden? The tags are part of our plant records system, and unless you've been involved in actually tracking down a specific plant you may not realize how much information those numbers give us. The numbers refer to the Garden's Accession Books, our most valuable records.

Here's how the basic system works. When the Garden receives a plant, it is immediately assigned a number and entered in the current Accession Book. When the first accessions were done here, a group of plants of the same species were all given the same number; now we give each individual plant its own number. Besides the number and botanical name, the accession record includes the date of accession and the origin — anything we know about where the plant came from — the nursery's name if the plant was purchased, and habitat details if it was a collected plant. Each plant's number is then embossed on an aluminum tag kept permanently with the plant.

Unfortunately, sometimes tags are lost — photographers and the garden crew's rakes are their biggest enemies — and when this happens accession information is lost. The source of the plant may seem a trivial matter, but it is an absolute necessity in studies of a plant's distribution and variation over its geographical range. On our International Seed List, the source of the parent plant is a very important part of the data included with all seeds distributed.

The first accessions were done in 1939. Plant number one, by the way, is a *Machaerocereus eruca* from Gilbert Tegelberg's California collection. In 1959 the year was added before the plant number. The first plant accessioned this way was No. 59-6380, *Opuntia spinosior* collected at Young, Arizona, by John Weber. By 1971 accession numbers were into the ten thousands. A plant number that year might have been 71-10234. To make the system easier to handle, we began to start each year's accessions with plant

number 1, so in 1971 the first accessioned plant was 71-1, *Yucca carnerosana* from the Clifford Schroeder collection. Entries in the Accession Books have a D added to the number when a plant dies.

At last count the live accessioned plants in the Garden totalled over 12,000. There are also many unaccessioned plants here, those originally growing in the area and volunteer plants.

All the information from the Accession Books is also cross-referenced to our Accessions Card file. This file contains one card per species. On the card are the bed number or numbers of each specimen of that species in the Garden, sources of the plants and accession numbers. This enables researchers to locate any species in the Garden quickly.

Keeping all these records is time-consuming but essential if a garden is to be a true botanical garden.

——SCK

GARDEN DOCENTS

During the month of February, Docents offered guided tours of the Garden to the general public for the first time. As Education Director, this is something I've always seen the need for — a school tour often increases in size as visitors follow along to hear the information. The tours were offered on Tuesday mornings and Thursday afternoons for visitors in the Garden at the time.

The first monthly advanced class for Docents was held February 27. The Garden's research botanist, Dr. Howard S. Gentry, was the guest speaker.

In January and February the Docents conducted tours for a variety of groups besides the many school classes. These included Rotary Club, Symphony Guild, Westerner Club, Sun City Rockhounds, a garden club, a university class, and several convention groups. If you get the idea that the Docents are busy, you're right.

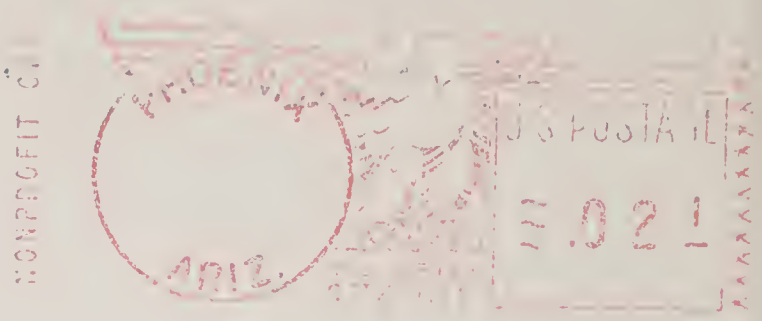
When Docents aren't busy leading tours, they've been helping in other areas of the Garden. A few of their special projects: Genevieve Oppen is organizing information on the Garden's history, Josselyn Bebee has started the detective work involved in identifying and cataloging our botanical prints not used in the show, Margaret Jenkins helps the garden crew keep up with accessions, Marce Sterrett works in the propagation area potting for the plant sale, and Lou Kossuth is organizing our duplicate and unused periodicals for sale or donation to ASU's library.

—SCK

Russell Haughey, who is handling the plant sales during the Cactus Show and the Annual Plant Sale in April recently came back from California with several thousand succulents purchased from four of the largest cactus and succulent nurseries there. Some of the plants our Members may want to look out for are: dichotomously branching and mounded Mammillarias, *Machaerocereus eruca,* a few seedling boojum trees, Espostoas, Euphorbias, *Pachypodium lameri,* Aeoniums, and, of course, Golden Barrels — some of them up to 26 inches across. The trees and large landscaping-type succulents will be held for the Annual Plant Sale, but there will be something for everyone at both sales, from ten-cent prickly pear pads to potted specimen plants.

HOLIDAY GIFTS — In the Garden's Shop you'll find beautiful potted cacti and succulents that make much appreciated presents.

DESERT BOTANICAL GARDEN



MR. J. HARRY LEHR
12434 NORTH 25TH PLACE
PHOENIX, ARIZONA 85028

MAY

P.O. BOX 5415
PHOENIX, AZ. 85010

Garden Events

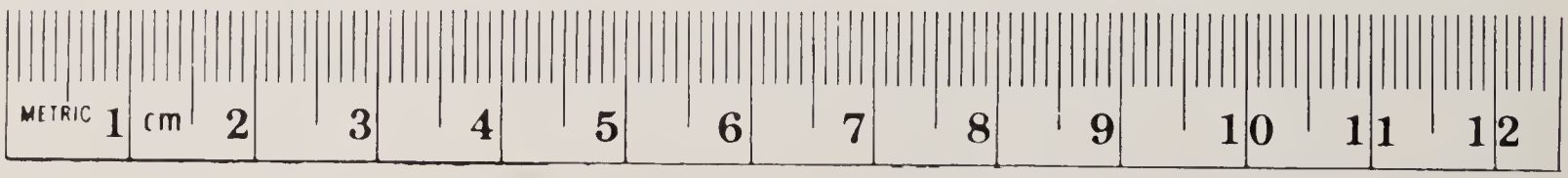
MARCH

PUBLIC LECTURES, in the Garden's Auditorium, March 2nd, 23rd and 30th, 3 p.m.
FIELD TRIP (open to the public) to Peralta Canyon, March 4th, 8 a.m.
31ST ANNUAL CACTUS SHOW, March 12th through March 19th, 9 a.m. to 7 p.m.
MEMBERS' FIELD TRIP to Cherry Creek, 8 a.m.
WILDFLOWERS CLASS, identifying and growing them. For beginners. Three Tuesday sessions include field trip. Starts March 28th, 2 p.m.
WHAT IS A DESERT? Introductory class covering deserts, desert plant life and desert landscaping. 5 Wednesday sessions and a field trip. Starts March 29th, 2 p.m.

APRIL

PUBLIC LECTURES, in the Garden's Auditorium, April 6th, 20th and 27th, 3 p.m.
DYEING WITH DESERT PLANTS. A four-session workshop. Starts Monday, April 3rd at 6:30pm.
MEMBERS' FIELD TRIP to Wickenburg area, Joshua Trees. April 8th, 8 a.m.
MEMBERS PREVIEW of Annual Sale of Unusual Plants, April 14th, 4 p.m. to sunset.
ANNUAL SALE OF UNUSUAL PLANTS FOR DESERT GARDENS. Hard-to-find and newly introduced trees, shrubs, cacti, other succulents. April 15th and 16th, 9 a.m. to 5 p.m.
PRACTICAL DESERT GARDENING. A four-session class. Starts Tuesday, April 18th at 6 p.m.
PLANT DRAWING FOR BEGINNERS. A four-session outdoor class in how to look at and draw desert plants. Starts Thursday, April 20, 9:30 a.m.
POISONOUS AND EDIBLE PLANTS. The class meets for three Thursday evening sessions and two Saturday field trips. Starts April 20th, 7 p.m.
FIELD TRIP (open to the public) to Humboldt Mountain. April 29th, 8 a.m.

For class fees, field trip reservations and other information,
telephone 947-2800 or 946-9942



31st Annual Cactus Show

March 12th through March 19th, 1978
9 a.m. to 7 p.m.
In the Garden's Webster Auditorium
Papago Park, Phoenix, Arizona

presented by

THE DESERT BOTANICAL GARDEN

SHOW RULES

Cacti and other succulents and allied material are eligible as listed in this schedule.

All plants must have been grown by the exhibitor for six months or longer. All plants must be labelled with appropriate botanical names.

The Committee reserves the right to reject plants or other entries if show regulations are violated, or if the exhibit is not up to standard. Rejected entries will not be displayed.

In Section I, Class A, and Section II, Class A, additional divisions may be set up when two or more exhibitors are represented, and a total of three or more specimens entered.

In Section III, seedlings must be under 2 years old and must have been germinated by the exhibitor. Labels must include date of germination in addition to botanical name.

In Section V, all plants must be rooted plants that have been grown in the exhibited container for six months or longer.

In Section VI, accessories are permissible, but exclude artificial foliage, artificial flowers, artificial color. Non-desert plant materials will not be considered as accessories. Entries in Classes A through D by reservation only.

In Sections VII and VIII, all blue ribbon winners in all divisions of Sections I and II of the 1977 Cactus Show are eligible. No limit to number of entries.

Exhibitors in Sections IX and X must contact the Garden in advance to reserve space and to verify that exhibits are appropriate.

The Desert Botanical Garden will exercise due caution and care in safeguarding the exhibits, but can assume no responsibility for loss or damage, or for unclaimed exhibits.

CLASSIFICATIONS

SECTION I CACTI

Class A. Individual Specimens. Limited to 3 entries per division.

— Divisions —

1. Ariocarpus, Aztekium, Obregonia
2. Astrophytum
3. Columnar Cereus, North America
4. Columnar Cereus, South America
5. Copiapoa, Parodia, Matucana
6. Coryphantha, Echinomastus, Escobaria, Neolloydia
7. Echinocactus, Ferocactus, Hamatocactus
8. Echinocereus
9. Echinopsis, Lobivia
10. Epithelantha
11. Gymnocalycium, Rebutia
12. Mammillaria, pots up to 4″
13. Mammillaria, pots over 4″, to 10″
14. Mammillaria, pots over 10″
15. Melocactus, Discocactus
16. Neoporteria, Neochilenia
17. Notocactus
18. Opuntia, Pterocactus, Tephrocactus, Grusonia
19. Pediocactus, Toumeya, Utahia, Sclerocactus
20. Pelecyphora, Solisia, Turbinicarpus
21. Stenocactus
22. Thelocactus
23. Any other genus

Class B. Crested or Monstrose
- Division 1. Own root
- Division 2. Grafted

Class C. Grafted

Class D. Collections, 4 to 6 different species of a genus.

SECTION II SUCCULENTS OTHER THAN CACTI

Class A. Individual Specimens. Limited to 3 entries per division.

— Divisions —

1. Adromischus
2. Aeonium
3. Agave
4. Aloe
5. Anacampseros
6. Asclepiads, Stapelias, etc.
7. Conophytum
8. Cotyledon
9. Crassula
10. Echeveria, Dudleya, Graptopetalum, Sempervivum
11. Euphorbia
12. Haworthia, Gasteria, Astroloba
13. Kalanchoe
14. Lithops
15. Pleiospilos

16. Sedum, Pachyphytums
17. Senecio, Kleinia, Stylophyllum
18. Other Mesembryanthemaceae
19. Any other genus

Class B. Collections, 4 to 6 different species of a genus.

SECTION III SEEDLINGS

Limited to 2 entries per class.

Class A. Cacti

Class B. Succulents other than Cacti

Class C. Desert Trees and Shrubs

SECTION IV DESERT TREES AND SHRUBS

Limited to 2 entries per class.

Class A. Trees and Shrubs

Class B. Desert Bonsai

Class C. Caudiciforms

SECTION V PLANTERS, all rooted plants

Limited to 3 entries per class. Divisions applicable to Class A only: 1. Cacti. 2. Other succulents. 3. Cacti and other succulents.

Class A. Dish Gardens

Class B. Hanging Planters — cacti, other succulents, or both, containers to 15″ diameter.

Class C. Patio Planters — cacti, other succulents, or both, containers over 15″ diameter.

SECTION VI ARRANGEMENTS, no rooted plants

Limited to one entry per class in Classes A through D, one entry per division in Classes E through G.

Class A. Using dried Arizona desert material, accessories permitted, exhibitor to furnish own background (36″ high x 24″ wide with 12″ wings).

Class B. Using cacti, suitable for a coffee table (18″ x 18″ exhibit space).

Class C. Using succulents other than cacti, suitable for mantel, exhibitor to furnish own background (36″ high x 24″ wide with 12″ wings).

Class D. Monochrome arrangement featuring cacti, other succulents, or both.

Divisions applicable to Classes E, F and G: 1. Cacti, other succulents, or both. 2. Dried Arizona desert material.

Class E. Button arrangements

Class F. Miniature arranagements, under 5″

Class G. Corsages

SECTION VII WINNERS' CIRCLE — CACTI

Individual specimens that received blue ribbons in 1977.

SECTION VIII WINNERS' CIRCLE — SUCCULENTS OTHER THAN CACTI

Individual specimens that received blue ribbons in 1977.

SECTION IX EDUCATION EXHIBITS, non-competitive

Dealing with aspects of desert botany.

SECTION X OPEN, non-competitive

Displays by clubs, societies, commercial growers.

REGISTRATION, ENTRY OF EXHIBITS, JUDGING

Registration Cards (one for each exhibitor) and Exhibit Cards (one for each exhibit) may be obtained from the Garden. Registration Cards must be filled out before registration day. Exhibitors planning to enter five or more exhibits in the Show are required to fill out Exhibit Cards in advance, and all Exhibitors are encouraged to do so.

Write to Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. Phone 947-2800.

Exhibits will be accepted according to the following schedule. (Exceptions will be made only for plant exhibitors who live more than 100 miles from Phoenix and have notified the Garden in advance): Thursday, March 9, 9 a.m. to 5 p.m. Friday, March 10, 9 a.m. to 9 p.m.

Judging will be held March 11. The decision of the judges will be final. First, Second, Third and Honorable Mention ribbons may be awarded in each class or division. Trophies may be awarded in each class. Sweepstakes awards will be given to exhibitors accumulating the most blue ribbons in Sections I, II and VI. The Phoenix Gazette Sweepstakes Trophy will be awarded to the exhibitor accumulating the most blue ribbons in the Show as a whole.

Exhibits may be removed only after 5 p.m. on March 19.

The following scale of points is used in judging these entries:

CACTI & SUCCULENTS SPECIMEN PLANTS	
Condition	50
Nomenclature	10
Difficulty of culture	10
Size or degree of maturity	15
Staging	15
	100

ARRANGEMENTS & PLANTERS	
Design	30
Color	20
Identification of material	10
Originality & distinction	30
Condition	10
	100

BUTTON & MINIATURES	
Scale	40
Design	30
Color harmony	20
Condition	10
	100

CORSAGES	
Technique	25
Design	35
Color	15
Combination of materials	15
Condition	10
	100

Judges for all sections are acknowledged experts.

Sections V and VI will be judged by Judges accredited by the National Council of State Garden Clubs.

SAGUAROLAND BULLETIN

APRIL, 1978

SAGUAROLAND BULLETIN Editor, Lillian Diven

APRIL, 1978 Vol. XXXII No. 4

DESERT BOTANICAL GARDEN

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Cover and photos on pages 40, 41, 42, 43, 44 and 45 by Gerczynski Photographs.

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Individual	$ 15.00
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Published and owned by the Arizona Cactus and Native Flora Society, sponsors of the Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. The Saguaroland Bulletin is published to disseminate information on the Garden and on desert plants and their culture. Issued 10 times a year.

ARIZONA CACTUS AND NATIVE FLORA SOCIETY

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REPORT ON THE 1978 CACTUS SHOW

This year's Cactus Show exhibits were without a doubt the most handsome of any Show we've had. For many years exhibitors have wistfully mentioned how much better their plants looked in March than in February and how many more of them were in flower. There certainly were flowers — one day during the Show we counted 69 plants in bloom. We were also spared the worry about nighttime frost protection for plants exhibited on the patio.

March 12th, opening day, started out overcast, proceeded to rain, and resolved into sleet by mid-afternoon. Consequently, attendance on that day fell to 800 – almost 4,000 below last year's record. Even though succeeding days were good and the Garden ablaze with bloom, attendance overall for the Show fell below one-half of last year's attendance. Suggested causes ranged from "bad weather the first day", "tourists have gone because of this winter's rains", "too many events going on in the area", "Show dates changed", "we now charge admission", to "not enough advertising". The total attendance was about 12,000. I suspect that the two major reasons were the awful weather and the competition with other events.

On the brighter side, however, revenues fell only slightly below last year's record.

Despite the lower attendance the new parking lot constructed by the staff was put to good use, providing parking and turning space for buses and large recreational vehicles. This lot was constructed north of the paved public parking lot, leaving a green-belt space between the two to soften the visual effect. The green belt also allowed us to save several large old ironwood trees and provide space for planting a windbreak to keep down the dust from the new, unpaved lot.

The Annual Cactus Show Plant Sale profited very well from the generous donations of potted plants, cuttings and bareroot plants donated by the many members, friends and

The week before the Show, 22 tables are set up in the Auditorium and covered with about 80 yards of 8-ft.-wide burlap. Nine more are set up in the patio and covered with brown paper.

When the entries start coming in, everybody is recruited. Here the Horticulturist, Editor and Education Director help Henry Triesler unload his plants.

volunteers of the Garden. Each year the Garden can do more and provide more because of the efforts of such dedicated individuals. This year's seed sale was greatly enlarged and provided a great service to our visitors who wished to "travel light". Some unusual and beautiful plants will doubtless find their way into cultivation in this way. The chairman of this project has asked that the money from the sale of seed be placed in the greenhouse fund -- this seems most appropriate. If you missed buying seed at the sale, you have another opportunity at the Sale of Unusual Plants in April.

I mentioned a greenhouse in the above paragraph. The Garden has always needed such a facility. At the last board meeting the board committed itself to this project as the next phase in the Garden's development. To introduce the public to this basic need, flyers were distributed by several board members and volunteers during the Show. They also solicited contributions toward the planning. The solar energy department at Arizona State University has been contacted, and several department people are interested in the project. The greenhouse will be a public display greenhouse, with sections set aside for propagation and teaching. If you would like to contribute to this project or would like more information regarding it, please contact the Garden.

Two new features of the Show were the information and membership table in the auditorium and a talking Saguaro named Sadie. Sadie is seven feet tall, has pink cheeks and false eyelashes, wears a crown of white flowers, and is accompanied by an elf owl puppet who lives in her right arm. Sadie and the volunteers manning the information booth greeted visitors and helped them with directions, questions about the Show and information about the Garden.

Despite the lower attendance, we were very pleased with the Show. We had many new exhibitors up from Tucson, many of whom carried away well-deserved prizes.

VOLUNTEERS — STARS OF THE CACTUS SHOW

This year again, for the thirty-first time, the Cactus Show was possible only because of the Show volunteers. Well before the Show opened they began to help with poster distribution and mailings, during the two exhibit-entering days they contributed brains and considerable brawn (moving heavy planters isn't easy), on judging day they did more of the same and also acted as judges' clerks, handled a blizzard of paper work and got everything ready for opening day. We needn't tell you, even if we could count them, all the tasks the Show Volunteers did during Show Week. It's not just politeness to say that our Show Volunteers are essential, it's a fact.

Our grateful thanks to all Show Volunteers, with an extra bow to Margaret Caldwell who helped set the Show up, cooked lunch for thirty people one day, and headed the drive for funds for our needed greenhouse. Two more bows in the direction of Angie Nicosia and Jean Geiss who wrote newspaper stories for the home-town papers of all outside-Phoenix prize winners, and another bow to Dan Evans for offering to be "useful" and doing much more than he had promised.

Ninety volunteers this year — what a lot of good friends the Garden has! Here are their names:

Phil and Frank Hennessey, Christa Roberts, Irma Adams, Henry Triesler, Margaret Caldwell, Nettie Cederstrand, Sudie Odabashian, Dixie Mills, Jane O'Neal, Elizabeth Cargill, Penny Matthew, Fran Tolleson, Margaret Jenkins.

Ruth Thurber, Nancy Rheinlander, Dan Evans, Mr. and Mrs. Frank Strike, Elizabeth Fritz, Virginia Spangler, Dave Sundstrom, Mildred Hunt, Martha Passwater, Jane Purtill, Richard Colberg, Lou Kossuth, Khrybel Amberg, Bill Gardner, Peggy Kaduck, Dorothy Kravens, Em La Tempa, Andy Romanyak, Chet Groseclose, Dorothy Carson, Muriel Freeman, Mr. and Mrs. Nate Greenberg, Bill Tucker.

Every single exhibit has to be entered in the Show Book, identified and given a number. In this photo Exhibitor Emma Oscarson and Sherry Krummen are checking Mrs. Oscarson's entries.

Mary Hale, Mr. and Mrs. W. C. Rosenbaum, Rosebud Rudolph, Tom Caldwell, Genevieve Oppen, Warner Dodd, Walter Jorgenson, Bob Moulis, Joan Skirvin, John and Jessie Ower, Nancy Thompson.

Marie Kephart, Nevelyn Hopkins, Marie Gentry, Betty Schrieber, Lucille Earle, Ginny Sanger, Lela Turner, Jan Moats, Jean Haughey, Lillian Mieg, Lola Engard, Carolyn Miller, Vera Starbuck.

George Andersen, Harriet Bonney, Berdie Stevens, Zoe Dodd, Helen Gipson, Wendy Hodgson, Ollie Belle Case, Roberta Hendrikx, Blanche Mikac, Clare Thompson, Joy Lee Weber.

To all of you, a million thanks.

—Sherry Krummen

THIRTY-FIRST ANNUAL CACTUS SHOW

SWEEPSTAKES AWARDS

CACTUS (Most blue ribbons in section): Fran Tolleson
OTHER SUCCULENTS (Most blue ribbons in section): Kathy McCombs
ARRANGEMENTS (Most blue ribbons in section): Joan Gossman
PHOENIX GAZETTE AWARD (Most blue ribbons in show): Fran Tolleson

TROPHY AWARDS

BEST CACTUS IN SHOW: Judi Gaston — *Oroya gibbosa*
BEST SUCCULENT IN SHOW: Kathy McCombs — *Conophytum mundum*

Judges Berdie Stevens, Althea Staggs and Betty Schimek, with Genevieve Oppen acting as clerk, discuss the dish gardens. They also judged the arrangements section.

BEST SEEDLING: Ernest Gunnell — *Euphorbia clava*
BEST EUPHORBIA: Fran Tolleson — *E. bougheyi*
BEST CAUDICIFORM: Ernest Gunnell — *Kedostris africana*
BEST PLANTER: Martha Passwater
BEST CACTUS COLLECTION: Joan Skirvin — *Mammillaria* spp.
BEST SUCCULENT COLLECTION: Kathy Corbett — *Lithops* spp.
BEST MAMMILLARIA: Alan Blackburn — *M. bombycina*
BEST CRESTED CACTUS: Dan Birt — *Monvillea spegazzinii*
BEST LARGE ARRANGEMENT: Joan Smith
BEST SMALL ARRANGEMENT: Joan Gossman
SPECIAL AWARD: Richard Wiedhopf — *Gymnocalycium vatteri* var. *longispina*
SPECIAL AWARD: Genevieve Oppen — *Lobivia rebutioides* (crest)
SPECIAL AWARD: Richard F. Gibbons — *Mammillaria nejapensis*

RIBBON AWARDS

SECTION I. CACTI. CLASS A, SPECIMEN PLANTS.

1. ARIOCARPUS, AZTEKIUM, OBREGONIA. 1st, 2nd and 3rd, Fran Tolleson. 4th, Margaret Kaduck.
2. ASTROPHYTUM. 1st, Dan Birt. 2nd and 3rd, Fran Tolleson. 4th and 4th, Warner Dodd.
3. COLUMNAR CEREUS, NORTH AMERICA. 1st, Nancy Clarke. 2nd, Henry Triesler.
4. COLUMNAR CEREUS, SOUTH AMERICA. 1st, Nancy Clarke. 2nd and 3rd, Henry Triesler.
5. COPIAPOA, PARODIA, MATUCANA. 1st, Charles Fellers. 2nd, Joan Skirvin. 3rd and 4th, Kay Dunlap. 4th, Fran Tolleson.

From the left, clerk Martha Passwater, then judges Gary Lyons, Shannon Lyons and W. H. Earle. They judged cactus, succulents, seedlings and desert trees.

After the judging, the ribbons and trophies have to be placed by the winning exhibits and a list of winners compiled. Sherry Krummen and Genevieve Oppen did those jobs on Saturday afternoon.

6. CORYPHANTHA, ECHINOMASTUS, ESCOBARIA, NEOLLOYDIA. 1st, and 2nd, Genevieve Oppen. 3rd, Martha Passwater. 4th, Earl Christensen. 4th, Kathy Corbett.
7. ECHINOCACTUS, FEROCACTUS, HAMATOCACTUS. 1st, Fran Tolleson. 2nd, Heinz Mueller. 3rd, Nancy Clarke. 4th, George Andersen.
8. ECHINOCEREUS. 1st, Myrtle Ethington. 2nd, 4th and 4th, Fran Tolleson. 3rd, Margaret Kaduck.
9. ECHINOPSIS, LOBIVIA. 1st, Fran Tolleson. 2nd, Nancy Clarke. 3rd, Henry Triesler. 4th, Richard F. Gibbons.
10. EPITHELANTHA. 1st and 3rd, Martha Passwater. 2nd, Fran Tolleson.
11. GYMNOCALICIUM, REBUTIA. 1st, Fran Tolleson. 2nd, Nancy Clarke. 3rd, Barbara Markley. 4th, Earl Christensen. 4th, Genevieve Oppen.
12. MAMMILLARIA (Pots up to 4") 1st, Barbara Markley. 2nd, Joan Skirvin. 3rd, Myrtle Ethington. 4th, Emma Oscarson. 4th, Nancy Clarke.
13. MAMMILLARIA (Pots 4" to 10") 1st, Alan Blackburn. 2nd and 4th, Myrtle Ethington. 3rd, Fran Tolleson. 4th, Richard F. Gibbons.
14. MAMMILLARIA (Pots over 10" ; 1st, Fran Tolleson. 2nd and 3rd, Genevieve Oppen. 4th, Sharon Walter.
15. MELOCACTUS, DISCOCACTUS. 1st, Margaret Kaduck. 2nd, Richard Wiedhopf. 3rd, Genevieve Oppen. 4th, Nancy Clarke.
16. NEOPORTERIA, NEOCHILENIA. 1st, Judi Gaston. 2nd, Genevieve Oppen. 3rd, Nancy Clarke. 4th, Kathy Corbett.
17. NOTOCACTUS. 1st, Martha Passwater. 2nd, Henry Triesler. 3rd, Kathy Corbett. 4th, Fran Tolleson. 4th, Barbara Markley.
18. OPUNTIA, PTEROCACTUS, TEPHROCACTUS, GRUSONIA. 1st, 3rd and 4th, Margaret Kaduck. 2nd, Eileen Beauregard.
19. PEDIOCACTUS, TOUMEYA, UTAHIA, SCLEROCACTUS. (no awards).

On Sunday morning, Sherry Krummen and Kathy Corbett carried Sadie Saguaro out into the Garden, where "she" quickly became the comical hit of the Show.

20. PELECYPHORA, SOLISIA, TURBINICARPUS. 1st, Genevieve Oppen. 2nd, Emma Oscarson. 3rd, Fran Tolleson.
21. STENOCACTUS. 1st, Lewis Steichman. 2nd, Margaret Kaduck. 3rd, Genevieve Oppen.
22. THELOCACTUS. 1st and 2nd, Fran Tolleson. 3rd, Martha Passwater. 4th, Emma Oscarson.
23. ANY OTHER GENUS. 1st, Judi Gaston. 2nd, Richard Wiedhopf. 3rd and 4th, Margaret Kaduck. 4th, Fran Tolleson.
24. ESPOSTOA. 1st and 3rd, Fran Tolleson. 2nd, Lewis Steichman. 4th, Mrs. Richard Enz.
25. OREOCEREUS. 1st and 3rd, Fran Tolleson. 2nd, Heinz Mueller. 4th, Genevieve Oppen. 4th, Emma Oscarson.
26. WILCOXIA. 1st and 2nd, Genevieve Oppen. 3rd, Lewis Steichman.
27. CHAMAECEREUS. 1st, Mrs. Richard Enz. 2nd, Martha Passwater.
28. CEPHALOCEREUS. 1st, Richard Wiedhopf. 2nd, Margaret Kaduck. 3rd, Genevieve Oppen.
29. TRICHOCEREUS. 1st, Warner Dodd. 2nd, Eileen Beauregard.

CLASS B. CRESTED OR MONSTROSE.

1. OWN ROOT. 1st, Dan Birt. 2nd, Genevieve Oppen. 3rd, Kay Dunlap. 4th, Alan Blackburn. 4th, Henry Triesler.
2. GRAFTED. 1st and 3rd, Lewis Steichman. 2nd, Alan Blackburn.

CLASS C. GRAFTED. 1st and 3rd, Joan Skirvin. 2nd and 4th, Beth Kidwell.

CLASS D. COLLECTIONS. 1st and 2nd, Joan Skirvin. 3rd, Richard Wiedhopf. 4th, Genevieve Oppen. 4th, Nancy Clarke.

(RIBBON AWARDS IN SECTIONS II THROUGH VI
WILL APPEAR IN NEXT MONTH'S BULLETIN)

Cactus, Entertainment and Tea

On April 8, 9 and 10, 1938, Phoenix' first cactus show was held at the Tropical Grove Nursery on Thomas Road and Chicago Avenue (now 40th Street). Open from one to nine p.m., Friday, Saturday and Sunday, with a 50 cents admission charge, it was sponsored by the Arizona Cactus and Native Flora Society of which Mrs. C. D. Webster was the president. Gertrude Webster, the great matriarch and a founder of the Desert Botanical Garden, also served as chairman of the show.

About sixty members of the national Cactus and Succulent Society of America attended, and several served as judges including their president W. Taylor Marshall, who later became director of the Desert Botanical Garden.

According to the Arizona Republic, April 9, 1938, the show attracted at least 200 persons to the Tropical Grove Nursery on the first day.

"A novel feature of yesterday's event was a flower fashion show at which beautifully gowned Phoenix society women displayed the proper flowers to wear on every occasion (business office, luncheon, tea, formal dance)." "Tea was served yesterday and will be served today and tomorrow as part of the cactus show."

On Saturday, table arrangements of flowers for various occasions were displayed, and on Sunday the Anozira Club from Phoenix Union High School presented a vocal octet — the Cecilian Singers also performed. "Prominent folk participated."

The show was kept over on Monday for the benefit of Phoenix school children — over 1,000 children gave up school to attend.

Adults were sometimes surprised to hear Sadie Saguaro talk — the kids weren't. Lisa Dezelsky was inside Sadie when this picture was taken.

Peggy Kaduck entered a **Buxbaumia militaris** *in the Show, Cub Scout Eric Kreuger wore a Davy Crockett hat when he came to see the Show — and naturally we had to have a picture of Eric and the cactus.*

And who won the prizes? From the Arizona Republic, April 11, 1938 again, here is a sampling of the winners: Blue ribbons: Best cactus, Gustav Starck (a founder of Arizona Cactus and Native Flora Society.) Best graft, J. W. Evans ("Whit" Evans to us. He still has a cactus nursery in Phoenix). Best cristate plant, Gustav Starck. Best collection of succulents, Mrs. C. D. Webster. Best collection of euphorbias, Mrs. C. D. Webster. Best collection of exotic species of Echinopsis and allied genera, Mrs. C. D. Webster. Rarest cactus, J. W. Evans. Best collection of exotic species of Melocactus, J. W. Evans. Best collection of exotic species of genera other than the above (limited to 12), Mrs. C. D. Webster. Sweepstake prize, Boyce Thompson Southwestern Arboretum. Best container planted to depict an idea or artistic motive (sunset on desert, moonlight on desert, etc.), Mrs. C. D. Webster.

The next cactus show was not destined to take place until 1946.

—Genevieve Oppen

* * *

Gen Oppen, in addition to being a show exhibitor, show volunteer and Garden Docent, has taken on the job of compiling a history of the Garden. She has been interviewing old-time Garden friends and members, and got the material for this report from various clippings in Lela Turner's scrapbooks.

ELECTION — enclosed with this issue is your ballot for the annual election of Garden Board members. One seat is to be filled this year, and you may vote for the nominee or write in the name of another person. All votes will be tabulated at the Annual Members' Meeting here at the Garden on May 21st at 3 p.m.

THE GARDEN'S CHIRICAHUA TRIP — also enclosed with this issue is information about a very exciting bus tour. We wish everyone could see this special corner of southeast Arizona, but space is very limited, so send in your reservations right now.

DESERT BOTANICAL GARDEN

P.O. BOX 5415
PHOENIX, AZ. 85010

Garden Events

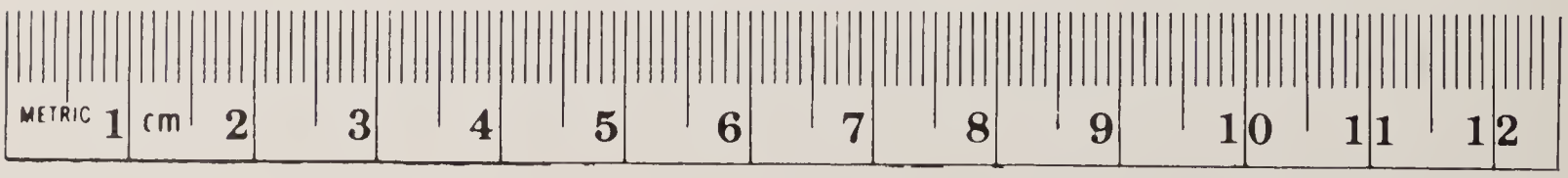
APRIL

PUBLIC LECTURES, in the Garden's Auditorium, April 6th, 20th and 27th, 3 p.m.
DYEING WITH DESERT PLANTS. A four-session workshop. Starts Monday, April 3rd at 6:30pm.
MEMBERS' FIELD TRIP to Wickenburg area, Joshua Trees. April 8th, 8 a.m.
MEMBERS PREVIEW of Annual Sale of Unusual Plants, April 14th, 4 p.m. to sunset.
ANNUAL SALE OF UNUSUAL PLANTS FOR DESERT GARDENS. Hard-to-find and newly introduced trees, shrubs, cacti, other succulents. April 15th and 16th, 9 a.m. to 5 p.m.
PRACTICAL DESERT GARDENING. A four-session class. Starts Tuesday, April 18th at 6 p.m.
PLANT DRAWING FOR BEGINNERS. A four-session outdoor class in how to look at and draw desert plants. Starts Thursday, April 20, 9:30 a.m.
POISONOUS AND EDIBLE PLANTS. The class meets for three Thursday evening sessions and two Saturday field trips. Starts April 20th, 7 p.m.
FIELD TRIP (open to the public) to Humboldt Mountain. April 29th, 8 a.m.

MAY

FIELD IDENTIFICATION, An intermediate course in desert plant identification. 5 Wednesday evening sessions and a Saturday field trip. Starts May 3rd at 6 p.m.
TERRARIUMS AND DISH GARDENS, A one-day workshop. Friday, May 5, 9:30 a.m. to 2 p.m.
MEMBERS' FIELD TRIP to the Sierra Anchas. May 13, 8 a.m.
USEFUL DESERT PLANTS· A two-session evening workshop on identification and uses of some dye, fiber, medicinal and other plants. Starts Thursday, May 25th at 6:30 p.m.
FIELD TRIP (open to the public) to Sycamore Creek. May 27, 8 a.m.

For class fees, field trip reservations and other information,
telephone 947-2800 or 946-9942



SAGUAROLAND BULLETIN

MAY 1978

SAGUAROLAND BULLETIN Editor, Lillian Diven

MAY, 1978 Vol. XXXII No. 5

DESERT BOTANICAL GARDEN

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Cover: *Coldenia plicata* (DBG photo)

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ANNUAL MEMBERSHIP
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Benefactor $100.00
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High School . . . . . $ 3.00

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Published and owned by the Arizona Cactus and Native Flora Society, sponsors of the Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. The Saguaroland Bulletin is published to disseminate information on the Garden and on desert plants and their culture. Issued 10 times a year.

ARIZONA CACTUS AND NATIVE FLORA SOCIETY

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ADVISORY BOARD: James Cahill, Lillian Diven, Geraldine Eliot, Donald W. Hutton, Charles F. Merbs.

News & Notes

Many of our attractive desert plants do not have showy flowers. This is clearly true of the plant featured on this month's cover. **Coldenia plicata** is a low-desert perennial which seldom rises much more than four inches above the sandy or gravelly plains and terraces where it grows in occasional abundance. The blue flowers are minute, hidden among the deeply-pleated leaves. Leaves are only 8-10 mm long. The combination of ash-green pleated leaves in a symmetrical pattern against the contrasting texture of sand and dark shadows is sufficient reward for the careful observer. This plant is in the Borage family, along with the more familiar Fiddleneck and Popcorn Flower.

A thread of continuity runs through the various feature articles in this issue of the Bulletin. Each of them touches on ethnobotany, the systematic study of the various uses to which indigenous peoples put the plants around them. Plants may be used simply as food, or may have multiple uses, as is demonstrated by the mesquite and saguaro. The field of ethnobotany is a most interesting one. If you would like to learn more, consider signing up early for the "Useful Desert Plants" workshop that starts on May 25th.

* * *

We hope all Garden Members are planning to attend the Annual Members' Meeting on May 21st in the Webster Auditorium. A slide presentation of the year's activities will be shown, and reports of Garden departments will be presented.

This year we are arranging a special "behind the scenes" tour of the Garden for our Members, with our staff and docents on hand to explain the various functions of the Garden's facilities that aren't open to the public. It will start at 1:30 p.m., before the Annual Meeting at 3:00 p.m. The staff is enthusiastic about the idea, and we think you'll enjoy the tour.

* * *

It may just possibly have come to your attention that we have had an unusually wet winter. This made spectacular displays of wildflowers in some areas, and kept the office and horticultural staff busy with phone calls about "where to go for the best show." Callers were routinely directed to us by the Extension Office, Tourist Bureau, Department of Horticulture, Arizona Highways and other agencies. Individuals called us from California, Texas

(Continued on page 59)

The Gifts of the Mesquite Tree

"To the Indians of the Sonora Desert, mesquite beans were their most important food, even more important than corn. It was mesquite atole (gruel) that sustained them day after day through the winter until the next cultivated crop was ready... The mesquite bean provides goodly amounts of protein, carbohydrates and calcium." From Niethammer, American Indian Food and Lore.

There are more Palo Verdes in the desert, but at least one writer has called the Mesquite (**Prosopis spp.**) the most successful tree of the southern deserts. It is, at any rate, the most dramatically successful in finding water. When a mesquite seed germinates, most of its food supply goes to nourish the rapidly growing root rather than the leaves and stems. Only after the root has located a water source does the mesquite begin to show any significant growth above ground. Try to pull up a two-inch Mesquite seedling and it resists your full strength. Dig it out, and you will find its tap root is a foot long or more.

With access to water, along streambeds or wherever else there is plentiful underground water, the Mesquite forms thick stands of tall broad trees, but it is not confined to such habitats. It is also found on desert hills, on slopes and in grassland. At one time the tap root was thought to be of an average length of forty feet, but Larson says that in 1960 an open pit mine was developed near Tucson, and large numbers of Mesquite roots were found in a gravel bed 175 ft. below ground surface. Not the fine root hairs at the end of the tap root, but thick roots, indicating an even greater depth. Water level at this site was eventually reached at 240 ft.

The genus Prosopis is basically an aridland genus, and predominantly one of the western hemisphere, although four of its twenty-odd species are found in southwest

Asia and Africa. The remaining species stretch between southern Kansas and the Argentine province of Patagonia.

Arizona is the home of the Screwbean Mesquite (**P. pubescens**) and the Honey Mesquite (**P. velutina, P. juliflora, P. glandulosa** — depending on the botanical authority). The Honey Mesquite is much more widespread than the Screwbean, even increasing in our area as it invades overgrazed grassland. It is the species commonly used for food, with pods that contain between 25 and 30 percent grape sugar, a higher percentage than even sugar beets contain. Four tablespoons of mesquite meal provide 70 calories.

The long, sweet mesquite pods have traditionally been ground into a meal which was prepared as cakes and as mush. Unground pods, minus their hard seeds, were eaten raw or cooked, and also boiled in ample water, mashed, and strained for a refreshing drink.

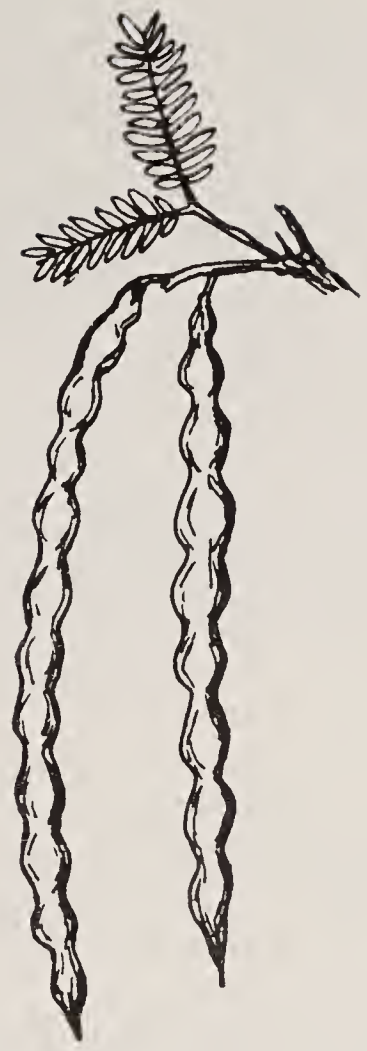
The dark brown gum that oozes from cut branches has been eaten as is, or made into candy. In recent years we have heard of it used as a cough remedy.

Another gift from the Mesquite is Mesquite honey, a favorite with many Southwesterners, Indian and non-Indian. But the uses of Mesquite do not stop with edible things. Arrow tips were made of Mesquite long ago, and more recently Mesquite gum was used for making designs on pottery and as one ingredient of a mud pack to make hair soft and glossy. Even today, though more and more seldom, Mesquite bark fibres are used in basketry.

There seems to be no end of the applications of the bark, gum, wood and fruit of the Mesquite tree, but its major importance has always been as a source of food.

The Mesquite atole mentioned in the first paragraph was made by drying the pods and grinding them into a fine meal, which was then cooked with enough water to make a thin porridge.

Niethammer gives several recipes for using Mesquite meal. A moderately adventurous cook might try this one: For a bread recipe calling for 8 cups of flour, substitute one-half to 2 cups of Mesquite meal and proceed as usual. This makes a dark and somewhat heavy bread.



Genny Remington of the Southwest Research Station was the source of the first-rate recipe for prickly-pear jelly we printed in the Bulletin some years ago. Now we have her recipe for Mesquite jelly, another delicious treat, and just as easy to make.

First, a word of caution. Some Mesquite beans taste a little of cinnamon, others are lemony, but occasionally some taste soapy. So, taste the juice before you add the sugar and pectin.

MESQUITE JELLY

Wash and break ripe mesquite beans into a large pot.

Cover with water, cover pot and boil 30 minutes after boiling point is reached. Strain and taste.

To 5 cups of juice add one box of powdered pectin.

Bring to a hard boil and add 7 cups of sugar.
Return to a boil and boil hard for 7 minutes.
Skim, ladle into sterilized jars and seal.

Add a bit of food coloring to the strained juice if you wish. Without coloring it looks like apple jelly.

REFERENCES
Burkart, Monograph on the Genus Prosopis
Kearney & Peebles, Arizona Flora
Kirk, Wild Edible Plants of the Western United States
Larson, Deserts of America
Murphey, Indian Uses of Native Plants
Niethammer, American Indian Food and Lore

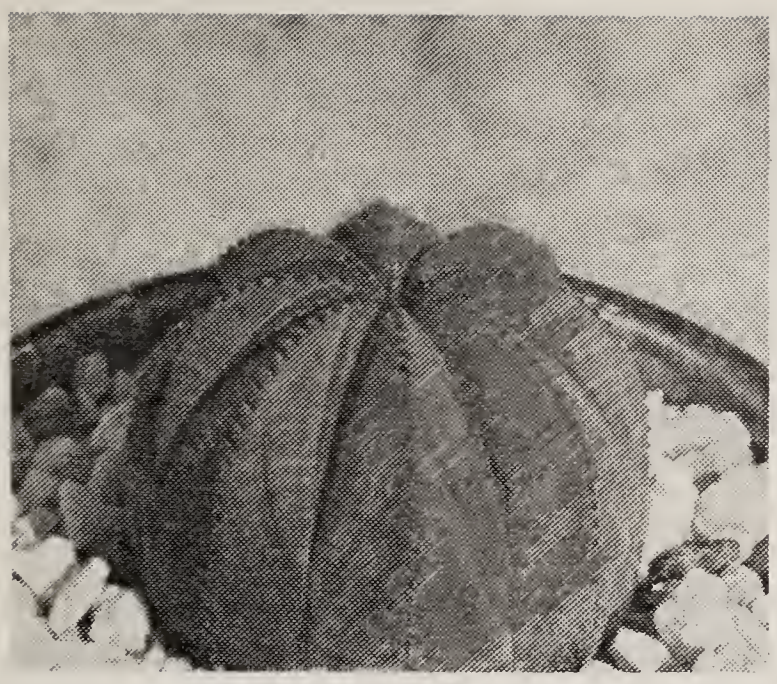
——LD

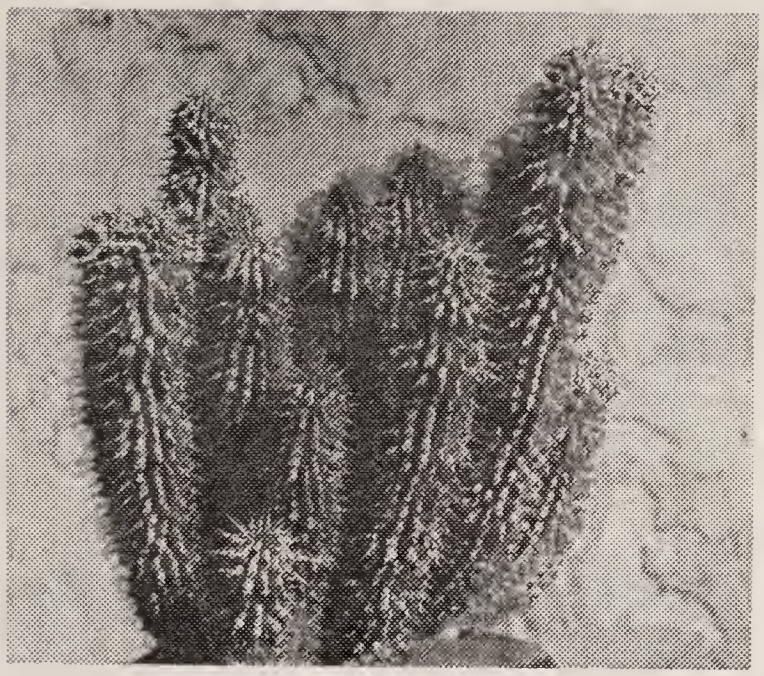
THIRTY FIRST ANNUAL CACTUS SHOW

RIBBON AWARDS (continued)

SECTION II. SUCCULENTS OTHER THAN CACTI.
CLASS A. INDIVIDUAL SPECIMENS.

1. ADROMISCHUS. 1st, Kathy McCombs. 2nd and 3rd, Martha Passwater.
2. AEONIUM. 1st, Kathy Corbett. 2nd and 3rd, Fran Tolleson.
3. AGAVE. 1st and 4th, Henry Triesler. 2nd, Fran Tolleson. 3rd, Kathy Corbett. 4th, George Andersen.
4. ALOE. 1st, Sarah Ives. 2nd, Nancy Clarke, 3rd, Martha Passwater. 4th, Dan Birt.
5. ANACAMPSEROS. 1st, Lewis Steichman.
6. ASCLEPIADS. 1st, Lewis Steichman. 2nd, Sarah Ives. 3rd, Kenneth Asplund. 4th Nancy Clarke.
7. CONOPHYTUM. 1st, 2nd and 4th, Kathy McCombs. 3rd and 4th, Lewis Steichman. 4th, Fran Tolleson.
8. COTYLEDON. 1st, Sarah Ives. 2nd and 3rd, Lewis Steichman.
9. CRASSULA. 1st, Joan Skirvin. 2nd and 4th, Lewis Steichman. 3rd and 4th, Fran Tolleson.
10. ECHEVERIA, DUDLEYA, GRAPTOPETALUM, SEMPERVIVUM. 1st and 2nd, Kenneth Asplund. 3rd, Ernest Gunnell. 4th, Bud Terrell. 4th and 4th, Henry Triesler.
11. EUPHORBIA. 1st, Fran Tolleson. 2nd and 4th, Ernest Gunnell. 3rd, Richard Wiedhopf. 4th, Henry Triesler.
12. HAWORTHIA, GASTERIA, ASTROLOBA. 1st, Joan Skirvin, 2nd, Martha Passwater. 3rd, Myrtle Ethington. 4th, Nancy Clarke. 4th, Henry Triesler. 4th, Kathy McCombs.
13. KALANCHOE. 1st, C. R. Taylor. 2nd, Abby Jeans. 3rd, Fran Tolleson. 4th, Nancy Clarke. 4th, Emma Oscarson.
14. LITHOPS. 1st, Martha Passwater. 2nd Kathy Corbett. 3rd and 4th, Kathy McCombs.
15. PLEIOSPILOS. 1st, Martha Passwater. 2nd, Fran Tolleson.
16. SEDUM, PACHYPHYTUM. 1st, Margaret Kaduck. 2nd, Joan Skirvin. 3rd, Bud Terrell. 4th, Martha Passwater.
17. SENECIO, KLEINIA, STYLOPHYLLUM. 1st, Sarah Ives. 2nd, Myrtle Ethington. 3rd, Earl Christensen. 4th, Bonnie Rodriquez.
18. OTHER MESEMBRYANTHEMACEAE. 1st, 3rd and 4th, Kathy McCombs. 2nd, Martha Passwater.
19. ANY OTHER GENUS. 1st, 2nd and 4th, Ernest Gunnell. 3rd, Fran Tolleson.
20. PACHYPODIUM. 1st, Genevieve Oppen. 2nd, Earl Christensen. 3rd, Lewis Steichman.





Gerczynski Photographs

The *Euphorbia obesa* at left was entered by Margaret Kaduck. Joan Skirvin exhibited the grafted *Notocactus leninghausenii.*

21. HOYA. 1st and 2nd, Bud Terrell.

CLASS B. COLLECTIONS. 1st, Kathy Corbett. 2nd, Joan Skirvin. 3rd, Henry Triesler.- 4th, Lewis Steichman.

SECTION III. SEEDLINGS

CLASS A. CACTI. 1st and 3rd, Charles Merbs. 2nd and 4th, Martha Passwater. 4th, Kathy Corbett.

CLASS B. OTHER SUCCULENTS. 1st, Ernest Gunnell. 2nd, Genevieve Open. 3rd, Fran Tolleson.

CLASS C. DESERT TREES AND SHRUBS. 1st and 3rd, Charles Merbs. 2nd, Sarah Ives.

SECTION IV. DESERT TREES AND SHRUBS

CLASS A. TREES AND SHRUBS. 1st and 2nd, Nancy Clarke. 3rd, Henry Triesler. 4th, Lewis Steichman.

CLASS B. DESERT BONSAI. 1st, Ernest Gunnell. 2nd, Nancy Clarke. 3rd, Henry Triesler. 4th, Margaret Caldwell.

CLASS C. CAUDICIFORMS. 1st and 2nd, Henry Triesler. 3rd, Dan Birt.

SECTION V. PLANTERS.

CLASS A. DISH GARDENS.

1. CACTI. 1st, Fran Tolleson. 2nd, Joan Skirvin. 3rd, Jacqueline Evans.
2. OTHER SUCCULENTS. 1st, Martha Passwater. 2nd, Fran Tolleson. 3rd, Barbara Markley.
3. CACTI & OTHER SUCCULENTS. 1st, Linda Landry. 2nd, Jacqueline Evans. 3rd, Martha Passwater.

CLASS B. HANGING PLANTERS. 1st, Fran Tolleson. 2nd and 3rd, Martha Passwater.

CLASS C. PATIO PLANTERS. 1st, Margaret Caldwell. 2nd, Mrs. W. H. Chrisman. 3rd, Margaret Kaduck.

SECTION VI. ARRANGEMENTS.

CLASS A. DRIED ARIZONA DESERT MATERIAL. 1st, Joan Smith. 2nd, Pat Beauvais. 3rd, Joan Gossman.

CLASS B. CACTI. 2nd, Joan Gossman.
CLASS C. SUCCULENTS. 1st, Joan Gossman.
CLASS D. MONOCHROME. 1st, Joan Gossman.
CLASS E. BUTTON ARRANGEMENTS.
1. CACTI AND OR SUCCULENTS. 1st, Joan Gossman.
2. DRIED DESERT MATERIAL. 1st, Joan Gossman. 2nd, Pat Beauvais. 3rd, Joan Smith.

CLASS F. MINIATURE ARRANGEMENTS.
1. CACTI AND OR SUCCULENTS. 2nd, Joan Gossman.
2. DRIED DESERT MATERIAL. 1st, Joan Gossman.

MEDICINAL PLANTS OF ARIZONA

When an Indian child had a fever, his mother may have collected Quaking Aspen bark to help him get well. Today one of the most useful medicines for reducing fever is aspirin, a prepared compound of salicin, the active principle in Quaking Aspen and willow bark. Many plants used medicinally by the Indians and early settlers have recognized therapeutic importance today, and many others are currently being investigated by modern pharmacological chemists.

Traditional medicines can be roughly divided into two groups: those that had actual physical value and those that were primarily of psychological value. Both played an important part in early medicine. Here we will discuss only the former, a few of those plants that are listed in the **Survey of Recognized Native and Introduced Drug Plants of Arizona**, by the College of Pharmacy, University of Arizona.

An infusion of Quaking Aspen (**Populus tremuloides**) bark was used in the treatment of scurvy and as a general tonic, as well as a cure for fevers. The inner bark of many willows (**Salix** species) also contains salicin.

Mormon Tea (**Ephedra** species) was esteemed by the Indians and early settlers as a treatment for syphilis and tuberculosis. Today the tea is used as a tonic and contains alkaloids such as pseudoephedrin, similar to ephedrine, an astringent and mild - adrenalin substitute obtained from **E. sinica**, a Chinese plant. The basic recipe for this strong, bitter tea is one handful of fresh or dried stems per cup of boiling water.

The Hopi and Papago Indians used the roots of Canaigre (**Rumex hymenosepalus**), also called Wild Rhubarb and Dock, for treating colds and sore throats. Today the tuberous roots of several species (**R. crispus** and **R. obtusifolius**) are known to have cathartic properties.

Everyone has heard of mustard plasters. The seeds and roots of several common weedy mustards are now known to be skin stimulants, or rubefacients. The most common of these is Indian mustard (**Brassica juncea**).

Horehound (**Marrubium vulgare**) is another of the old standby remedies. It was formerly used in the treatment of colds, dyspepsia, and worms. Today its tonic and expectorant qualities make it useful in cough drops and throat lozenges.

Wormwood (**Artemisia ludoviciana** and other species) really does help get rid of worms. The dried leaves and flowers were used extensively by the Indians and early settlers as an anthelmintic — a cure for intestinal worms — and a diaphoretic — a substance to increase perspiration — as well as a bitter flavoring. The modern drug santonin, a remedy for roundworm, is obtained from **Artemisia mexicana**.

A cardiac stimulant similar, although inferior, to digitalis is obtained from the roots of Indian Hemp (**Apocynum cannabinum**). The medicinal value of this plant appears to have been known by the Indians.

Several of the Jimson Weeds, notably Sacred Datura (**Datura meteloides** in Arizona), contain atropine, useful in controlling bronchial spasms of asthma. Indians used Sacred Datura leaves as a pain killer for their horses and, in extreme cases, for themselves, knowing that the slightest overdose would be fatal.

Although all of these plants are recognized for their medicinal value, many are also recognized as poisonous or lethal in larger amounts. Always be absolutely sure of the plant's identification and edible or poisonous properties before sampling any wild plant.

——SCK

BOOK REVIEW

AMERICAN INDIAN FOOD AND LORE, by Carolyn Niethammer. New York, 1974. 191 pp., soft cover. $4.95 at the Garden Bookstore or $5.45 postpaid.

A book referred to in two articles in this issue and used frequently by the Garden staff should be brought to our Members' attention. We apologize for not having reviewed it before now.

Physically, "American Indian Food and Lore" is large and handsome, excellently laid out, with forty-nine detailed line-drawings by Jenean Thomson.

It is Carolyn Niethammer's wide-ranging interest and painstaking research, however, which makes the book valuable. She has studied the history of the Southwest and old references to native foods, and she has learned about present day foods through warm and friendly contact with Indian women of many Arizona and New Mexico tribes. The resulting ethnobotanical information is a combination of research and personal experience.

Over 150 authentic recipes were collected by the author for sweets and jams, breads, main dishes and soups. A respected cook, herself, she later tested every recipe in her own kitchen, often after collecting and preparing the wild ingredients. Throughout the book runs the pride and pleasure of good cooks talking to another good cook and exchanging recipes and "household hints". There is good-natured teasing of the author by Hopi women when she tried repeatedly to make Piki bread as thin as theirs, and there are occasional side remarks disparaging tastes and procedures of "the olden days" or of "some people". Altogether very human, and anthropology at its most readable.

Many other uses for native plants are listed, lotions and potions, basket fibres, etc., etc., but the emphasis is on good food.

We have only a single criticism of this book: its title is misleading. Better to have called it "Southwest Indian Food and Lore", since you'll find no Algonquin succotash recipes here, or native foods of any other part of the country. Aside from that, it's great. All of us at the Garden recommend it highly.

For over a year, the Maricopa Audubon Society has made twice-weekly visits to the Garden, and their completed check list of birds seen here is due from our printer this month. If you'd like a copy, let us know.

Long ago the Garden published a leaflet about what's in flower and when. We've revised and added to it, and given it a new name: When the Desert Blooms. Copies will be sent to all Members in an upcoming issue of the Bulletin, but if you want one sooner you can pick it up here.

Saguaro: A Desert Food Staple

As everyone has observed, this bulletin's namesake has a grandeur exceeding that of any other element in the flora of southern Arizona. Its economic importance today is based almost solely on its desirability as a dramatic accent in landscapes. Although it was doubtless also appreciated in this respect by the pre-Columbian peoples that occupied this land, its greatest importance was as an economic plant. It loomed so large in the lives of the Pima and Papago Indians who lived within its range that their new year started with the harvest of the dark red, three-inch-long fruits.

Traditionally, the women gathered fruit and boiled syrup from the dark red pulp, while the men gathered fuel and hauled water, often from considerable distances, to dilute the juice. Collecting was done then, and is still done, with an implement called a **ku'i pad** in Pima. By splicing two saguaro ribs together and tying a cross-bar at an acute angle to the main axis, the implement could be employed to pull the fruit off or dislodge it from the tips of the Saguaro arms high above the ground.

Sounds easy doesn't it? Now try it yourself in 105 degree F heat, in the blistering sun, maneuvering the awkwardly long pole and then stooping to retrieve your prizes for five to eight hours at a stretch. You get aches in your joints, juice and ants down your neck, and spines in your fingers.

Once in the hand, the fruit wall is split with the thumbnail, and the thumb inserted at the base of the bolus of seed and pulp. A deft pressure and upward lift pops the seedy mass into a container (a basket in old times, a plastic bucket more often now). The ovary wall is traditionally tossed away with some care so that it lands with the interior toward the sky. It is believed that this encourages early rains. By the method described, it is estimated that 14 to 15 quarts of fruit can be gathered in half a day. The heat of the afternoon can then be spent in preparing the final products.

The fruit is simmered (formerly in earthenware jars, currently in enameled pots or even galvanized wash tubs) until the pulp, seeds and juice have separated. The pulp and seeds are then strained out with sieves or skimmers made by attaching a stick handle to a large perforated tin can lid. The juice is then boiled down to a thick syrup and sealed in jars for later use. It is said by some authors that, sealed in earthenware jars, the syrup would keep for up to a year.

Preserves are made from the pulp. Seeds were shaped into balls for storage or were ground into flour, or used to feed chickens in later years. Reports persist that these cooked and therefore dead seeds are also occasionally sold to unwary seed

dealers. The fresh fruit is also simply dried and rehydrated for winter use.

My own favorite way to enjoy Saguaro fruit is to wait until the ovary wall of the fruit still on the plant has split irregularly, and the pulp, seeds and juice have dried in the air to the consistency of dough. At this point the sugars are fully formed and concentrated. Now you can eat the pulp and seed mass — simply pop it into your mouth, and chew.

Dried beyond this point, the fruit loses some of its palatability, and can become wormy if not properly stored. An occasional odd-tasting fruit is the result of the presence of formic acid from sugar-seeking ants that got caught in the pulp.

Portions of the syrup were set aside in large community wine-making ollas. It was fermented for the rain-making ceremonies. Anna Moore Shaw recalls in "A Pima Past", "Molly would join the other women on top of the **olas kih**, where they made fun of the men, who grew silly and clumsy from drinking the fermented fruit." The large jars for wine-making were kept in the council house. A ratio of 4 parts water to one part syrup produced a mildly intoxicating beverage in about 3 days. The entire supply was exhausted within a day or so, as the wine does not keep in the hot desert for very long. My own experience is that the wine is more than a little heady!

In addition to using Saguaro fruit in various ways, the dried ribs, being light, strong and straight, were also used. Roofs on ramadas, **olas kihs** (pit houses) and later adobe structures, were covered with these natural laths before brush and soil were used to roof the structure. They were also used in the wattle and daub walls of Indian houses.

In addition to feeding man, Saguaro fruits are food for innumerable birds, and for mammals ranging from rodents to foxes and coyotes.

The Saguaro is one of the most dependable food resources of the desert. Even in very dry years it produces at least some fruits. It is also one of the few available sweets in the desert. Carolyn Niethammer in "American Indian Food and Lore" reports the following nutritional analysis: about 34 calories per fruit; the seeds contain about 74 calories per 2 tablespoons and are high in protein, fat and vitamin C.

If you are interested in trying Saguaro recipes, I recommend the recipes in the Niethammer book. Some words of warning, though. Collecting Saguaro fruit is physically dangerous work in the heat. Snakes are also a hazard. Moreover, Saguaro National Monument and the Indian reservations are off limits. The local Indians still maintain "aboriginal rights" to collect in these areas, although few bother to collect saguaro fruit these days, leaving it to the enjoyment of wildlife and to cattle.

REFERENCES

Niethammer, **American Indian Food and Lore**

Shaw, **A Pima Remembers**

——RGE

News & Notes (cont.)

and as far away as Chicago. We have also been kept busy identifying plants brought in by members of the public — "I've never seen it before."

Something which also came along with the rain, and which we haven't seen in such abundance since 1973, is weeds. - Despite treatment with pre-emergent herbicides, the Garden was as green as Ireland for several months. As the short-lived winter weeds and grasses started to dry out last month we began to clean the beds out. It will be several months before the big job can be completed, even though it is priority work because it poses a severe fire hazard. Here at the Garden, April flowers bring May, June and July clean-up.

DESERT BOTANICAL GARDEN

P.O. BOX 5415
PHOENIX, AZ. 85010

Garden Events

MAY

FIELD IDENTIFICATION, An intermediate course in desert plant identification. 5 Wednesday evening sessions and a Saturday field trip. Starts May 3rd at 6 p.m.

TERRARIUMS AND DISH GARDENS, A one-day workshop. Friday, May 5, 9:30 a.m. to 2 p.m.

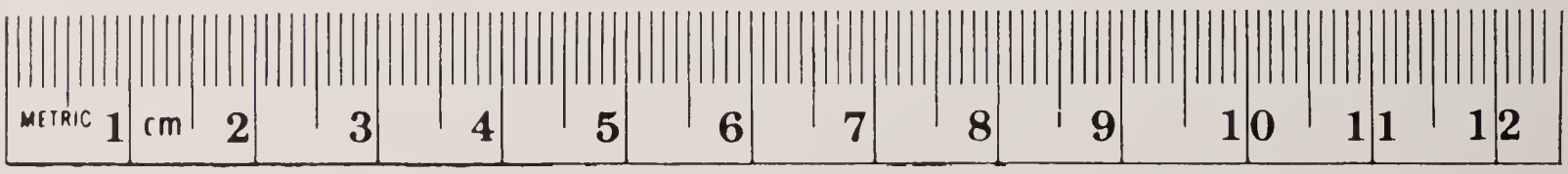
MEMBERS' FIELD TRIP to the Sierra Anchas. May 13, 8 a.m.

USEFUL DESERT PLANTS· A two-session evening workshop on identification and uses of some dye, fiber, medicinal and other plants. Starts Thursday, May 25th at 6:30 p.m.

FIELD TRIP (open to the public) to Sycamore Creek. May 27, 8 a.m.

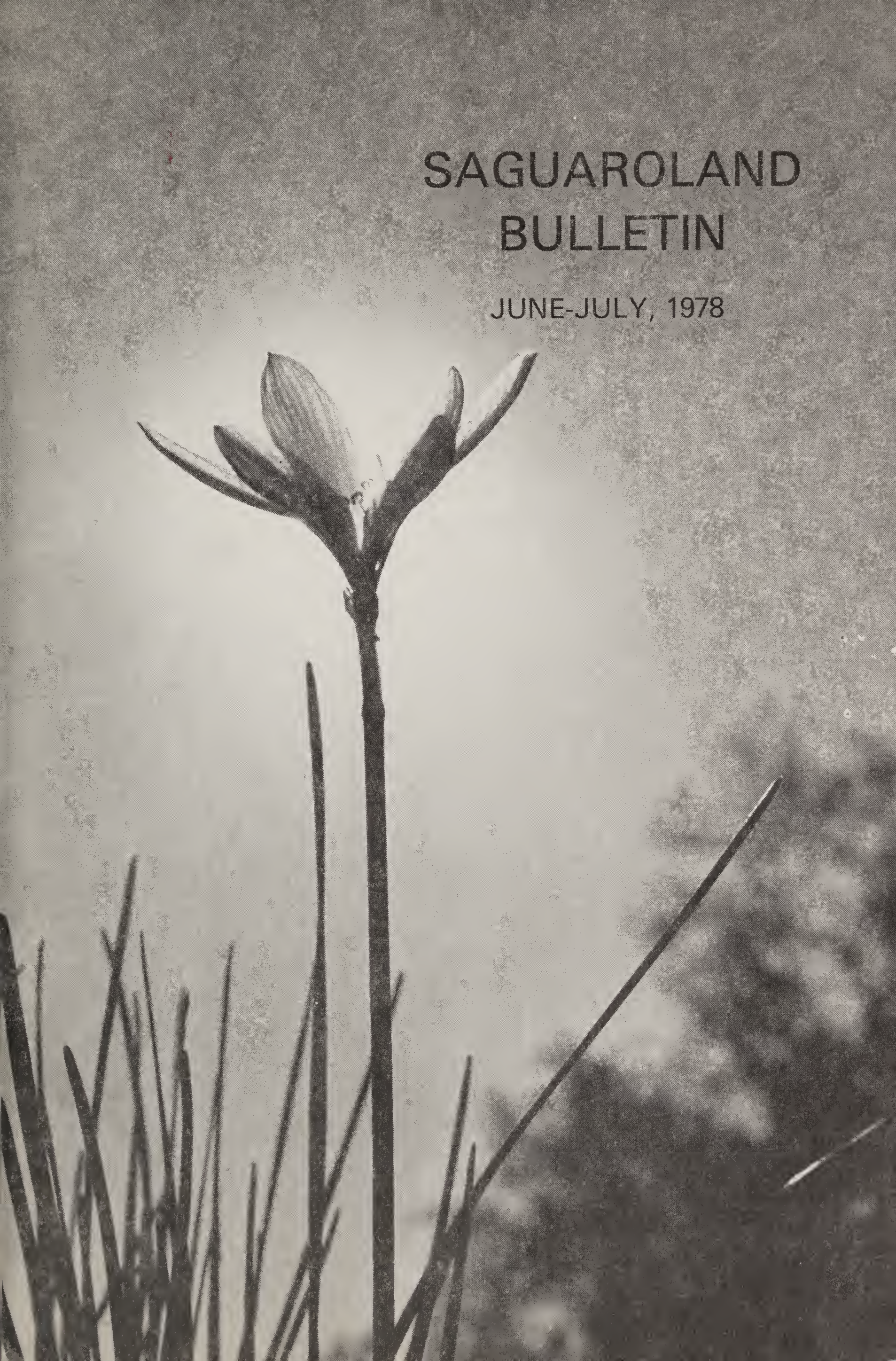
The Garden's summer schedule will start in July. There will be Children's Workshops and at least one class for adults. No events are definitely planned for June, but there is a possibility of one Members-only Field Trip. Check with the Garden for details.

For class fees, field trip reservations and other information,
telephone 947-2800 or 946-9942



SAGUAROLAND BULLETIN

JUNE-JULY, 1978



SAGUAROLAND BULLETIN Editor, Lillian Diven

JUNE-JULY 1978 Vol. XXXII No. 6

DESERT BOTANICAL GARDEN

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Cover: Mexican Star, *Milla biflora,*
a white-flowered native of southern Arizona. (DBG photo)

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ANNUAL MEMBERSHIP

Individual	$ 15.00
Family	$ 20.00
Sustaining	$ 50.00
Benefactor	$100.00
Elementary or High School	$ 3.00

LIFE MEMBERSHIP
$500.00

PATRON MEMBERSHIP
$1,000.00

Corporate Memberships available in Benefactor and Patron categories.

Director . . . . . Rodney G. Engard
Research Botanist . . . . . Howard S. Gentry
Curator of Herbarium . . . . . J. Harry Lehr
Educational Director . . . . . Sherry Krummen
Assistant . . . . . Christina Dezelsky
Superintendent . . . . . Russell Haughey
Propagator . . . . . Victor Gass
Office Manager . . . . . Janice Moats
Bookshop Manager . . . . . Lynn Trainum

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Published and owned by the Arizona Cactus and Native Flora Society, sponsors of the Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. The Saguaroland Bulletin is published to disseminate information on the Garden and on desert plants and their culture. Issued 10 times a year.

ARIZONA CACTUS AND NATIVE FLORA SOCIETY

EXECUTIVE BOARD: Chairman of the Board, John Rhuart. President, Mildred F. May. First Vice President, Henry Triesler. Second Vice President, Edward Burrall. Treasurer, Alice Feffer. Secretary, Barbara Kaiser. Margaret Caldwell, Thomas A. Goodnight, Donald W. Hutton, Naomi Kitchel, Lillian Mieg.

ADVISORY BOARD: James Cahill, W. H. Chester, Lillian Diven, Geraldine Eliot, Eric Maxwell, Charles F. Merbs, Duncan T. Patten, Donald J. Pinkava, Richard B. Snell.

ANNUAL MEMBERS' MEETING

Before the Annual Members' Meeting was convened at the Garden on Sunday, May 21st, 1978, the many Garden Members attending were given a "behind-the-scenes" tour by our Docents and staff members. On returning to the Webster Auditorium, they were served refreshments and viewed a video-taped film of the Garden.

The meeting was called to order by Board Chairman John Rhuart. Members Dorothy O'Rourke and Robert Moulis were delegated to count mailed-in ballots, and subsequently reported to the meeting the election of Margaret Caldwell to a four-year term on the Executive Board.

The appointment of Rodney Engard as Director of the Garden was announced by Board President Mildred F. May, as was the appointment of Russell Haughey to the post of Superintendent. Mr. Rhuart announced the addition to our Advisory Board of Dr. Donald J. Pinkava, Professor of Botany and Director of the Herbarium at Arizona State University, and of Dr. Duncan T. Patten, Professor and Chairman of the Department of Botany and Microbiology at the university.

Thomas Goodnight, Board Treasurer, presented to the Members the Garden's annual financial report and details of the budget for the coming year. Mr. Goodnight drew attention to the excellent financial condition of the Garden, attributable to the increased activities held at the Garden as much as to the institution of admission fees last June.

Director Rodney Engard reported briefly on the year's events and accomplishments, leaving details to the reports of heads of departments.

Dr. Gentry spoke of his Agave Project work, and department reports were presented by J. Harry Lehr on the herbarium, Sherry Krummen on the education department, Elizabeth Fritz on the library, Victor Gass on propagation, and Carolyn Hoppin on public relations. (Department reports are printed in this issue of the Bulletin.) Margaret Jenkins directed Members' attention to the excellent work of the Bookshop staff and volunteers.

ANNUAL BOARD MEETING

Following the Members' Meeting, the Garden's Board of Directors met in the Richter Library. John Rhuart, Chairman, presided. Naomi Kitchel presented the Nominating Committee's recommendations for officers for the coming year. The Board approved the recommendations. Officers of the Arizona Cactus and Native Flora Society, under which name the Garden is incorporated, for the year 1978-79 are: Chairman, John Rhuart. President, Mildred F. May. First Vice President, Henry Triesler. Second Vice President, Edward Burrall. Treasurer, Alice Feffer. Secretary, Barbara Kaiser. Donald W. Hutton was appointed a member of the Executive Board.

The Board approved the Garden's financial report and praised the outstanding work of the Garden staff during the past year, which resulted in exceptional improvements in all phases of the Garden's activities.

The By-Laws Committee will meet weekly, beginning in June, to prepare a revision of the Society's by-laws for presentation to the Board as a whole. The next Board Meeting will be held on June 8, 1978.

DIRECTOR'S REPORT

In this issue of the Bulletin the traditional annual reports of the year's activities are presented to our membership. The reports speak for themselves and for their authors. I am, and I am sure the members will be, proud and pleased with the admirable enthusiasm and ability reflected in these reports. The record of achievement of the staff

and volunteers is, I believe, quite remarkable. Our new staff members have a high standard to be measured against.

The Garden's financial position has been substantially enhanced by the institution of the paid admissions policy and increased receipts from our visitor's center. With this increased support we are now in a position to formulate a practicable and detailed master plan for the future of the Garden.

Rodney G. Engard
Director

The early '50s — "The Table" in the Auditorium served as the Garden gift shop. Therese Marshall, the Director's wife, was in charge. One year the sales receipts came to just a bit more than $4,000.

ARIZONA CACTUS & NATIVE FLORA SOCIETY, INC.
SPONSORING THE
DESERT BOTANICAL GARDEN

FINANCIAL REPORT April 1, 1977 - March 31, 1978

INCOME:	
Sales Receipts	$203,686.29
Admissions	96,615.62
Wholesale Seeds & Books	2,503.59
Memberships	13,177.00
Contributions	1,352.06
Interest, Endowment	374.70
National Science Foundation	1,232.80
Reimbursement & Misc.	5,625.28
	$324,567.34
From Reserve & Trust	75,400.35
	$399,967.69

EXPENDITURES:

Purchases for Resale	$127,252.06
Payroll (Net)	112,934.41
General & Administrative	35,843.83
Public Relations	4,531.14
Saguaroland Bulletin	1,633.10
Membership	707.81
Cactus Show	6,708.70
Professional Services	3,117.57
Taxes & Licenses	20,711.28
Garden Improvement & Maintenance	29,502.98
Building Improvement & Maintenance	3,948.80
Fleet	6,722.28
Furniture & Fixtures	6,001.63
Library	1,947.23
Herbarium	517.99
Education Dept.	1,288.35
Savings (1)	40,000.00
	$403,369.16

(1) Transferred from income to savings acct.

PROJECTED EXPENDITURES 1978-1979

Purchases for Resale	$125,000.00	Building Maintenance & Repair	2,500.00
Salaries	180,000.00	Fleet	6,700.00
General & Administrative	37,453.46	Furniture & Fixtures	1,000.00
Public Relations	5,000.00	Library	1,200.00
Saguaroland Bulletin	4,000.00	Herbarium	1,500.00
Memberships	1,000.00	Education Dept.	2,850.00
Cactus Show	7,500.00		$410,903.46
Professional Services	12,700.00		
Taxes & Licenses	4,500.00		
Garden Improvement & Maintenance	18,000.00	Projected Income	$425,000.00

Superintendent's Report

Much has happened this year in the areas of Garden horticulture and maintenance.

At the top of the list are two new staff members. Ross Berkheimer is in charge of maintenance, and there is nothing he cannot fix, build or invent. Victor Gass is now our plant propagator. The combination of his experience, his feeling for plants and his drive make him invaluable.

We now have six students from Arizona State University, thanks to work-study grants, and their presence is a great help in maintaining the appearance of the Garden. Our assistant horticulturist, Kevin Behm, recently resigned (he is moving out of town), but we have hired three new gardeners, and I am sure they will prove good additions to our staff. We have also added two night watchmen. In addition to providing night securi-

Summer '59 — a new entrance to the Garden. Our staff cut down pine trees near the Mogollon Rim, hauled them back, peeled them and built the entrance in time for the Garden's reopening in September.

ty, their presence enables us to keep the Garden open daily until sunset instead of closing at 5 p.m.

A number of major projects were completed in the last 12 months. Our existing paths and parking lot were seal-coated, all of the gravel paths were paved, and the long-needed surfacing of the service road was done. The Burrall Path, or Quail Run, through the arroyo was built and paved, and opened an attractive new area to our visitors.

In preparation for the crowds that regularly attend our Cactus Show, we graded two extra parking lots and added parking along the service road. These were all planned to blend with the contours of the Garden and are unobtrusive when not in use.

We were able to plant the Fouquieria beds near the Succulent House. They now contain nine of the fourteen known species of this interesting genus.

A new pipe line was run to the front gate in preparation for future landscaping of the entrance to the Garden. We added two independent drip systems to our flower beds, one of the single-emitter type that we use in other parts of the Garden, which waters the permanent plantings, and the other a perforated-tubing type for watering the wildflowers in late fall and winter. This double system has saved us hundreds of hours of watering and has helped make our wildflower beds bloom profusely.

In the dry years that preceded last winter's rains, hundreds of plants along our Arizona Flora Trail were destroyed by rabbits who seemed to think it was the Arizona Forage Trail. Many of the plants we salvaged from various projects and mine tailings sites around the state have been used as replacements, particularly chollas and other comparatively "rabbitproof" cactus. We enclosed more tempting plants with wire netting.

This year's plant sale was a success, grossing over $12,000. We have already begun work with growers for unusual plants for next year's sale.

Goals for 1978-79: Specifically, we hope to landscape the entrance and the road leading to the Visitors' Building. We expect to work even more on native plant salvage operations, which will result in further expansion of the Arizona Flora Trail. We will also expand our Australian Section, and start work on an African Section, using drip irrigation systems already on hand. We are making plans for a native desert palm grove in the

arroyo leading from the west side of the Visitors' Building, a logical site that will incidentally make the approach to the Garden more attractive. Time allowing, we will add a rock border along the Burrall Path, with some narrow beds for perennial wildflowers such as penstemons, mallows, etc.

Members of the Board and others have begun raising money for a display and teaching greenhouse to be located between the Cactus and the Succulent Houses. Those of us who work with plants look forward to it with great enthusiasm.

Russell A. Haughey
Superintendent

Education Department

The Docent Program was one of our happiest additions to the Garden last year. The training course for Garden guides was planned to last six weeks, but was expanded to eight weeks at the request of the Docents themselves. The course covered subjects that ranged from the history and current programs of the Garden through basic botany, desert gardening, the plants in the Garden and tour-leading techniques. Packets of required reading material went with every class, tests were given, and finally each Docent had to lead a practice tour with the other Docents.

At the end of the course, 27 very enthusiastic Docents were graduated and began devoting sixteen hours a month of volunteer work. Now, five months after graduation, the Garden Docents have led 94 groups on tours of the Garden — nearly 3000 people, a third of all the year's group visits.

In addition, Docent-guided tours were offered twice weekly in February to all visitors in the Garden at tour time. These tours proved very popular, and we plan to offer them on a regular basis next year, when we have more trained Docents.

The Docents' volunteer work when no tours are scheduled involved them in many aspects of the Garden, some of which are mentioned in other reports. Khrybel Amberg helped plan and set up the Art Show and the Botanical Print Show; Margaret Jenkins and Mildred Hunt are at the Bookshop; Lou Kossuth has catalogued our vast file of magazines; Genevieve Oppen gathers material on the Garden's history; Dorothy O'Rourke was the chairman of the Photography Show; Jane Purtill has been putting together gardening aprons with the Garden's Agave logo on them, exclusive "uniforms" for the Docents.

Nancy Rheinlander, who has long worked with the Girl Scouts, introduced an ecology game at a recent monthly Docents' meeting, and is adapting it for school-tour use; Ross Berkheimer, who is both a Garden staff member and a Docent, has given talks away from the Garden; Andy Romanyak, on the other hand, when there are no tours scheduled, simply gives unscheduled tours to the delight of Garden visitors.

Harriet Bonney, Chet Groseclose, Emmy LaTempa, Penny Matthew, Elizabeth Cargill, Dorothy O'Rourke and Sudie Odabashian deserve extra praise for their Cactus Show work, and Irma Adams and Marjie Bergan, who both work during the week, deserve praise for being our special Saturday-and Sunday Docents.

In every respect, our Docents are a great addition to the Garden. I just can't say enough good things about these fine people.

Last year we increased the Garden's class schedule to nineteen different classes and workshops, taught by this department, other members of the garden staff, and one outside instructor. Broadening the range of classes has attracted many more people to the Garden as well as giving more reasons for people to return.

We have tried to add courses that are appropriate and taught by qualified in-

structors, and they have been received with enthusiasm. A good example is Christina Dezelsky's Plant Drawing for Beginners. Chris is our Education Assistant who handles our art and display work and from time to time illustrates articles for the Saguaroland Bulletin. Last year she suggested that a few people might possibly like a course in drawing plants from life, here in the Garden. The course has become so popular that it was repeated twice, with nineteen people in the latest class, and requests for enrollment next fall.

The increase in classes and other Garden activities has resulted in our publishing our calendar of events twice a year now, to allow us space to describe activities. The Garden has also published new information leaflets this year, including a wildflower calendar and a bird check list. The Education Department also worked on two videotapes, one about the Garden as a whole (introduced at our Annual Members' Meeting) and the other, for school showings, about desert plants in general.

Plans for next year include new classes, workshops and field trips in a schedule similar to this year's. Another Docent Training Class will be held — members are already signing up for it. In order to reach groups outside the Garden, we plan to put together slide sets and appropriate scripts for loan to schools and clubs, and hope to develop information packets at several age levels to accompany the slides-and-script program when schools use it.

Sherry C. Krummen
Education Director

Herbarium Report

Our herbarium continues its growth and our collections now number about 17,000 specimens. This is an increase of approximately 2000 numbers: an annual rate of growth which has prevailed since the reactivation of the herbarium in 1969. In the past year we have initiated exchange programs with the University of Colorado and the University of Nevada in Las Vegas; both States contiguous to our borders and containing species common to the three States. Our collection of Carices (Sedges) continues to grow and our herbarium now contains representatives of over fifty percent of the North American species growing north of Mexico.

As an extra-curricular activity during the past year your Curator has compiled a "Catalogue of the Flora of Arizona." The initiation of this study was prompted by the need for a current checklist of Arizona's flora, and with the approval of your Board the manuscript is now in press with a promised September 1 publication date.

J. Harry Lehr
Curator of the Herbarium

Library Report

During the past year the library added 72 new titles in books. Of these, 13 were gifts. In a highly specialized library such as ours, such a total is not so small as it might seem. Only a limited number of titles are published each year that are applicable to our area of botany. Unless we have a direct need for specific titles in peripheral areas we do not add them to our collection, since the technical books are among the most expensive published — a one-volume flora we added this year cost $54.00, for example, and another cost us $48.00 — after subtracting the standard library discount. We must be selective.

To the currently published journals (approximately 50) and other periodicals we subscribe to, we have added two journals and have purchased back issues of other journals where our holdings were incomplete.

The library is used more and more by the Garden staff and by our Docents. Visitors

The late '50s — our library occupied two 10½ ft. walls in the Director's office, which grew more and more crowded until the Richter Library was built in 1967-68.

have used the library for research in many subjects. We have welcomed docents from the Phoenix Zoo and researchers from universities and other botanical institutions.

Two of our library volunteers, Dorothy Carson and Muriel Freeman, continue the time-consuming task of copying, correcting and adding to our old catalog cards for transfer to the new catalog. It is slow work, but the project is at last making headway. Another volunteer, Virginia Spangler, deaccessions withdrawals from the collection, keeps records of all duplicates, indexes maps, reinforces covers, reads shelves, and helps in an endless variety of ways.

Our library's collection of botanical prints is gradually receiving the attention it needs. In preparation for last fall's exhibit of botanical art, about 125 prints were mounted on acid-free board, and approximately that number again have since been mounted. Plans have been made to mount the rest of the collection, amounting to some two hundred prints, in the same way. This standard museum-type preservation is essential for delicate old prints.

Our print collection comes from several sources. None of the prints had been catalogued before the show. In researching sources, artists and publishers for each of the many prints to be exhibited, we found to our great pleasure that our own library contained enough of the major books on botanical illustration for us to identify more than ninety per cent of the prints. Recently, Josselyn Bebee, one of the Garden Docents, has undertaken the job of cataloguing the entire collection.

The library's current needs are a humidity-controlled place for rare books and fireproof case to store our botanical prints. Fine books and fine prints deserve care.

Elizabeth Fritz
Librarian

Our supplies of two back issues of the Bulletin are quite low. If any Member has copies of the April 1977 and the March 1978 Bulletin, we would be very grateful to receive them.

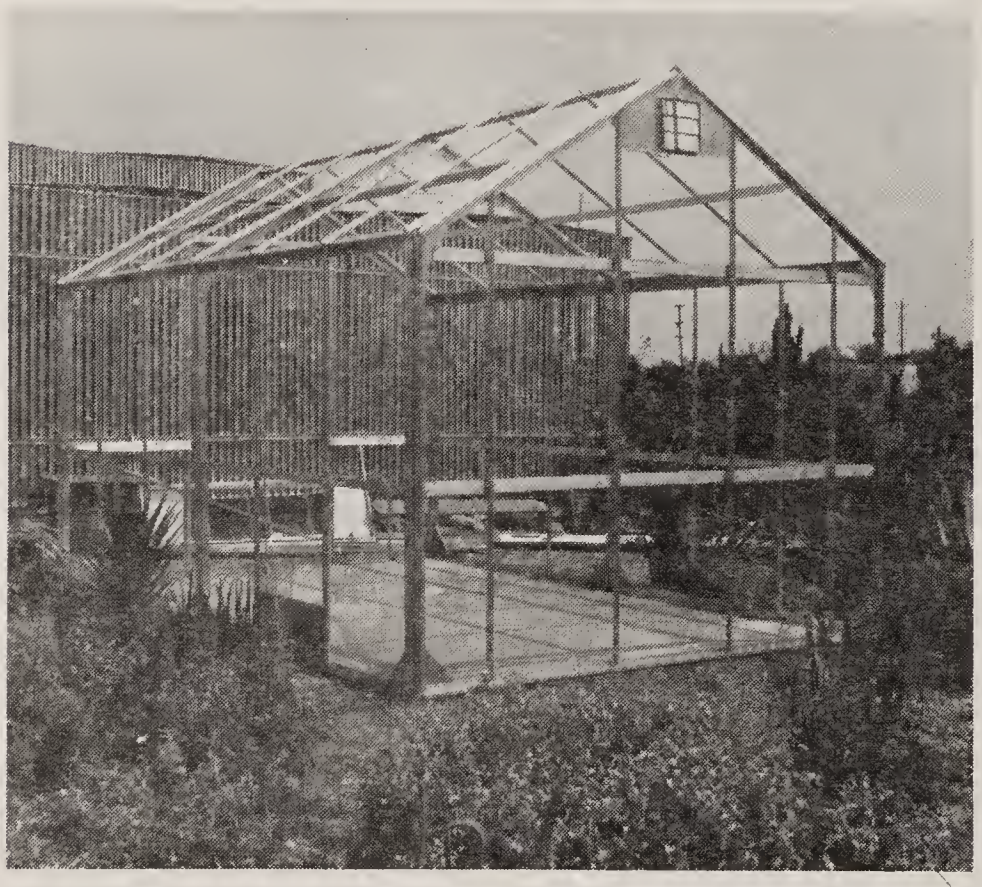
In listing the Cactus Show volunteers this year we unforgiveably left out three important names: Kathy Corbett, Charles Merbs and Dorothy O'Rourke. All three worked hard before, during and after the Show. We can only plead an epidemic of amnesia on the part of the Editor and the staff members who thought they had double-checked the list.

Plant Propagation and Accessions

Early last winter the position of Plant Propagator was established. The first thing tackled was the reorganization of the propagation area in and around the lath building behind the Cactus House. We increased the area and added storage space, to allow room for more plants and more space for those already present. This sort of "housecleaning" is an unavoidable part of a plant propagator's job. Next, we cleaned out the small greenhouse and installed a thermostat for heating and cooling control. As a result, I have a place for germinating seedlings. Up to now I have tried over 200 species, with roughly half of these germinating. Since there has not been a full-time propagator for some time prior to my arrival, some of the seeds accumulated were relatively old, but I felt it was worth trying to germinate them. From now on, with fresher seed, the chance of germination will be higher.

Our greatest success has been with the Acacias, African and Australian. We now have over 30 different interesting species growing, which will eventually be planted out in specific areas of the Garden set aside for plants from these continents.

To root cactus cuttings during the winter months, we built a small addition to the small greenhouse and installed a heating cable. This addition, if we utilize every square inch, will also hold a "mist bench" system for the rooting of leafy cuttings.



1955 — the Cactus Lath House was enlarged and this 8 x 12 ft. greenhouse was built, which is now far too small for the Garden's increased needs.

In the planning stage is a new nursery area which will play a vital role in the growing of plants for the Garden and also act as a storage area for some resale plants.

The regular volunteers who have helped me in the propagation area have done a tremendous job. I should like to thank Ollie Belle Case, Roberta Hendrikx, Earl Sundeen, Marce Sterrett, Nancy Rheinlander, Milton Jordan, Helen Mason and Josselyn Bebee. They have assisted me in the rooting of hundreds of cactus cuttings and the transplanting of many hundreds of seedlings. To start, they worked mostly on donated plants. The plants were prepared for sale at either the plant sale or at the bookstore. Later, of special help to me was their assistance in labeling and also arranging the plants by the year accessioned. This facilitated locating plants in the lath house. Much has still to be done in this respect, so the work continues.

Part of the Agave collection made by Dr. Gentry in the course of his work is here at the Desert Botanical Garden — over 500 plants. Many have already been in the ground for years, but some have yet to be planted. The task of transplanting them from pots into the grounds has begun. This will not only allow these plants to reach mature proportions, but it will also give more space for the propagation of more Agaves for the Garden's collection.

There will be new seeds obtained through exchange with other botanical gardens, from our own collection and from collections in the wild. As always, there will be cactus cuttings to be rooted or, as happens, re-rooted. As the collection increases and the Garden expands, so will the need for extra care of the new plants. This in turn will enable them to become true botanical garden specimens.

A total of 1,288 plants of approximately 80 genera have been accessioned since May, 1977.

Donations of 323 leaf succulent plants by Vivienne Doney and 134 plants by Dan Sorgenfrei were major additions to the collection.

The garden crew also added 600 more plants obtained from native plant rescue expeditions to various new construction areas in the state.

Many other friends have donated plants, among them Dave Grigsby of Vista, California, whose 18 large specimens of *Aloe ferox* for our planned African Section are awaiting accession.

Victor Gass
Plant Propagator

Public Relations

New or increased activities this year in the area of public relations have included active participation with the Valley of the Sun Convention and Visitor Center, cooperating with the Arizona Office of Tourism in publicizing off-season events, such as the botanical print show which took place during what the tourism office calls the "shoulder season", a period just before or just after our area's main winter tourist season. In addition, we are included in the calendars of the two major tourism offices, as well as in the Arts Council's widely distributed calendar and in Sunset Magazine. As a result, news of Garden events is receiving wider distribution.

News releases concerning our activities continue to be sent to a large number of newspapers and radio and television stations. The newspapers are calling us more and more frequently concerning many aspects of desert flora, so we know they are aware of our existence, which is all to the good.

A program to increase local awareness of the value of the Garden as more than a tourist attraction was just about swept away by the winter rains. In cooperation with the Salt River Project we cosponsored an awards program intended to give recognition to outstanding examples of "Arid-zona" landscaping, which we hoped would turn up some outstanding examples of desert plants used in landscaping both residential and commercial-industrial landscaping. Banks and other financial institutions distributed the nomination forms throughout Maricopa County and then it rained, so while you applied for flood damage loans you could read about drought-resistant landscaping. The program continued, nevertheless, and awards will be presented this summer, so you may yet see some attention paid to this unluckily-timed activity.

Carolyn Hoppin
Public Relations

DESERT BOTANICAL GARDEN

MRS. E. R. PARKER JAN.
4864 E. CAIDA DEL SOL
SCOTTSDALE, ARIZONA 85253

P.O. BOX 5415
PHOENIX, AZ. 85010

Garden Events

JUNE

CHILDREN'S WORKSHOP I. For ages 6 to 8. Five learning and doing sessions about desert plants, animals, crafts. June 19th through June 23rd, 8:30 a.m. to noon. Mid-morning snacks will be served. Fees: Members $15.00, non-members $20.00.

JULY

CHILDREN'S WORKSHOP II. For ages 9 to 11. Five varied sessions for older children. July 17th through 21st, 8:30 a.m. to noon. Mid-morning snacks. Fees same as above.

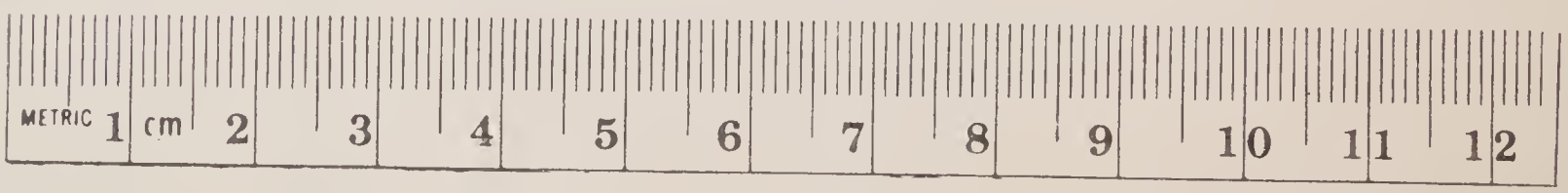
FIELD TRIP to Haigler Creek in Gila County, east of Payson. July 29th, 8 a.m. Note: This year all field trips will be open to the public, so we suggest early reservations. Fees: Members, $1.00, non-members $4.00.

On August 12th there will be a Saturday morning workshop on the Basics of Fall Vegetable Gardening. Victor Gass, our Plant Propagator, will be the instructor. Fees: Members, $5.00, non-members $7.50. Time: 9:30 a.m. to noon.

Other August activities will appear in the next issue of the Bulletin.

For class fees, field trip reservations and other information,
telephone 947-2800 or 946-9942

The Garden is open every day of the year from 9 a.m. to sunset.



DESERT BOTANICAL GARDEN
P.O. BOX 5415
PHOENIX, AZ. 85010
(602) 947-2800

DESERT BOTANICAL GARDEN
HUNTINGTON PLANT SALE SAFARI
NOVEMBER 3,4,&5, 1978

As a member of the Desert Botanical Garden, you are invited to join another exciting trip to California. We'll visit three famous southern California botanical gardens, climaxed by attendance at the fantastic Huntington Gardens plant sale. This annual sale covers nearly every plant category in the world. You won't want to miss it! We'll visit Rancho Santa Gardens in Claremont Friday afternoon, Descanso Gardens in La Canada Saturday morning, and the Huntington Library and Botanical Gardens Saturday afternoon. Sunday will be devoted to the plant sale.

TOUR PRICE INCLUDES: Transportation on A/C luxury bus, two nights at the beautiful Pasadena Holiday Inn, two fun lunches, refreshments on the bus, Continental breakfast prior to departure, entry fees, and tour escort.

SIGN UP TODAY! SPACE IS LIMITED!

FOR RESERVATIONS DETACH & RETURN THIS FORM WITH YOUR CHECK

DESERT BOTANICAL GARDEN
HUNTINGTON PLANT SALE SAFARI
NOVEMBER 3,4,&5, 1978

Please reserve the following accommodations:

( ) Double Room $100.00 per person ( ) Single $125.00

NAME (1) _____

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ADDRESS _____

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PHONE (Home) _____ (Business) _____

ATTACHED IS MY CHECK FOR $ _____
(Make checks payable to HUNTINGTON PLANT SALE SAFARI)

RETURN TO: HUNTINGTON PLANT SALE SAFARI
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Phoenix, Arizona 85020

CANCELLATION AFTER OCTOBER 19th SUBJECT TO $20.00 PENALTY

Tour arrangement by Southwest Convention Service
944-2594

A Non-Profit Incorporated Educational Society for the Study of Desert Plants

Desert Botanical Garden

Calendar of Events Summer-Fall 1978

Papago Park,
Phoenix, Arizona
access via 58th St.
and Van Buren St.
or 64th St. and McDowell Rd.
open every day of the year
9 a.m. to sunset

A Non-Profit Incorporated Educational Society
for the Study of Desert Plants

647-78

DESERT BOTANICAL GARDEN

Calendar of Events for Summer & Fall 1978

The Desert Botanical Garden is open to the public every day of the year 9 a.m. to sunset. Admission to the Garden is $1.00 for adults, 50c for children from five to fifteen, no charge for children under five.

CLASSES & WORKSHOPS: Daytime and evening classes and workshops of one to six weeks duration are held during the year. Fees vary, and are listed in this calendar. Reservations are required since enrollment is limited.

FIELD TRIPS: The Garden schedules one all-day field trip every month, open to both Garden Members and the public, except during the spring when two monthly trips are scheduled. Prepaid reservations are required. Meet in the Garden's Webster Auditorium (take the service road). Departure promptly at 8 a.m. unless otherwise specified. Participants travel in their own cars. Car-pooling and sharing of driving expenses are encouraged.

These trips involve easy to moderate hiking. Leaders are familiar with trip sites and will have the authority to disqualify persons unlikely to make the trip in safety.

Wear comfortable, suitable shoes (lug soles recommended), bring water and a lunch that can be carried with you on the hike.

PUBLIC LECTURES are scheduled on most Thursdays in the Webster Auditorium at 3 p.m., November through April. Admission to the Garden includes admission to the lecture.

CACTOMANIACS, an informal group interested in desert plants and related subjects, usually meets on the first Tuesday of the month. Visitors are welcome. Telephone 273-1953 for information.

The CENTRAL ARIZONA CACTUS & SUCCULENT SOCIETY, an affiliate of the national society, meets at the Garden at 2 p.m. on the last Sunday of the month, except when outside events are planned. Visitors are invited to meetings, but should telephone 266-7324 to check the CAC&SS schedule.

The ARIZONA NATIVE PLANT SOCIETY meets at the Garden at 7:30 p.m. on the first Wednesday of each month, except when outside events are planned. Telephone the Garden for information.

For further information on any Garden event, telephone 947-2800.

Note: From time to time additional classes, workshops and field trips may be arranged on short notice. Members of the Desert Botanical Garden will receive announcements.

JUNE

19-23	CHILDREN'S WORKSHOP I — ages 6 to 8. 5 learning and doing sessions about desert plants, animals, crafts. Mid-morning snack. Fees: Members, $15.00, non-members $20.00.	8:30 a.m.-noon

JULY

17-21	CHILDREN'S WORKSHOP II — ages 9 to 11. 5 varied sessions for older children. Mid-morning snack. Fees: Members, $15.00, non-members $20.00.	8:30 a.m.-noon
29	FIELD TRIP — HAIGLER CREEK. In Gila County, east of Payson. Summer wildflowers, pines. Fees: Members $1.00, non members $4.00.	8 a.m.

AUGUST

12	WORKSHOP — BASICS OF FALL VEGETABLE GARDENING· An introduction to what, where, when and how to plant successfully. Instructor, Victor Gass. Fees: Members $5.00, non-members $7.50.	9:30 a.m.-noon
16-30	CLASS — KEYS FOR PLANT IDENTIFICATION. How to track down — fearlessly — a plant's identity by using botanical keys. An intermediate course. 3 Wednesday sessions. Fees, including book: Members $7.50, Non-members $10.00.	9 a.m.-11 a.m.
26	FIELD TRIP — ARIVACA. In Pima County, south of Tucson. Habitat of rarer Arizona cacti. Fees: Members $1.00, non-members $4.00.	8 a.m.

SEPTEMBER

6	WORKSHOP — UNUSUAL CONTAINER PLANTS. New plants and new ideas for patio, porch, yard and indoor planters. Fees, including one plant: Members $5.00, non-members $7.50.	1:30 p.m.-4 p.m.
16	WORKSHOP — PLANT PROPAGATION· Victor Gass, plant propagator at the Garden, shows the best ways to start plants from seeds and cuttings. Fees, including some seeds and some cuttings: Members $5.00, non-members $7.50.	9:30 a.m.-noon
21-Oct. 1	CLASS — POISONOUS AND EDIBLE PLANTS. Learn identificaton of both types, their properties and uses. 2 Thursday sessions and one Sunday field trip. Fees, including books: Members $10.00, non-members $15.00.	7-9 p.m.
30	FIELD TRIP — FISH CREEK. In Maricopa County, on the Apache Trail. Later summer wildflowers. Fees: Members $1.00, non-members $4.00.	8 a.m.

OCTOBER

5-26	CLASS — PLANT DRAWING FOR BEGINNERS. An outdoor class in how to look at and how to draw plants. 4 Thursday sessions. Instructor, Christina Dezelsky. Fees, including basic materials: Members $7.50, non-members $10.00.	1 p.m.
5	Members' Preview of BOTANICAL ART SHOW	7-9 p.m.
6-15	2nd Annual BOTANICAL ART SHOW — An exhibit of botanical prints and originals from the 17th to the 20th Century, from the Garden's collection and on loan from recognized botanical artists of today.	9 a.m.-5 p.m.
18-19	WORKSHOP — USEFUL DESERT PLANTS. How traditional dye, fiber and medicinal plants were used and how to use them today. 2 consecutive	6:30 p.m.

	evening sessions. Fees, including book and samples of materials: Members $6.00, non-members $8.00.	
21-28	CLASS — DESERT GEOGRAPHY. Locations, characteristics and relationships of the world's deserts, with discussions of vegetation, climate and soils. 2 Saturday sessions. Fees: Members $10.00, non-members $12.00.	10 a.m.-noon
25	DOCENT TRAINING CLASSES begin. 10 weeks of intensive learning about the desert, the Desert Botanical Garden's history, features and plants. After graduating, docents spend 16 volunteer hours a month leading tours of the Garden and helping with special projects. There is no fee for Docent classes. (Classes not held during holidays.)	2 p.m.
28	FIELD TRIP — OAK CREEK CANYON. In Yavapai County, near Sedona. Fall color. Fees: Members $1.00, non-members $4.00.	8 a.m.
30-Nov. 27	CLASS — WHAT IS A DESERT? An introduction to deserts, desert plant life and desert landscaping. 5 Monday sessions plus 1 field trip. Fees, including book: Members $12.00, non-members $15.00.	2 p.m.

NOVEMBER

18	FIELD TRIP — BOX O WASH. In Pinal County, south of Florence. Many different prickly pears and cholla cactus. Fees: Members $1.00, non-members $4.00.	8 a.m.

DECEMBER

5	WORKSHOP — HOLIDAY DECORATIONS. Ideas and techniques using native and easily collected materials. This year, a Mexican flair. 1 Tuesday session (bring lunch). Fees, including most materials: Members $7.50, non-members $10.00.	9:30 a.m.-2 p.m.
8	WORKSHOP — HOLIDAY DECORATIONS. (Repeat of Dec. 5 workshop. See above.)	9:30 a.m.-2 p.m.
9	FIELD TRIP — ORGAN PIPE NATIONAL MONUMENT. In western Pima County. Cactus and birds. Fees: Members $1.00, non-members $4.00.	8 a.m.
19	LUMINARIA NIGHT — The Garden will be lit with traditional Southwest luminarias, and everyone will be admitted free of charge. Music and refreshments are planned.	7-9 p.m.

To be Scheduled

Carol Sakato, Landscape Architect, will teach a course in desert landscaping during the fall. Details will be available in early October.

MEMBERSHIP APPLICATION

Desert Botanical Garden
Box 5415, Phoenix, AZ 85010

Enclosed is my check for $_____. I wish to become a Member of the Desert Botanical Garden in the category checked below.

Mr.
Mrs.
Miss_____

Address_____

City_____ State_____ Zip_____

Annual Memberships: Individual, $15.00 ☐ **Family, $20.00** ☐ **Life Membership, $500.00** ☐
Sustaining, $50.00 ☐ **Benefactor, $100.00** ☐ **Patron Membership, $1,000.00** ☐

DESERT BOTANICAL GARDEN
P.O. BOX 5415
PHOENIX, AZ. 85010
(602) 947-2800

Special 1979 Events

Jan. 26-Feb. 4	PHOTO SHOW — Desert plants, animals and landscapes as seen by skilled photographers. A juried show.	9 a.m.-5 p.m.
Mar. 2	Members' Preview of ANNUAL SALE OF UNUSUAL PLANTS.	4 p.m.-sunset
Mar. 3-4	ANNUAL SALE OF UNUSUAL PLANTS FOR DESERT GARDENS. Newly introduced and hard-to-find trees and shrubs that thrive in the desert are specially grown for this exciting sale held each year to benefit the Garden.	9 a.m.-5 p.m.
Apr. 1-8	The THIRTY-SECOND ANNUAL CACTUS SHOW. The best growers of cactus and other succulent plants, as well as competitors in dish gardens, planters and arrangements, compete for awards in this nationally famous show. A major event since 1947.	9 a.m.-7 p.m.

IN ADDITION — classes, workshops, field trips, lectures. Several of the day and evening classes will be repeated, and new ones offered, including HOPE AND HELP FOR BROWN THUMBS.

(The 1979 Calendar of events will appear in early December. For information on any event telephone 947-2800.)

DESERT BOTANICAL GARDEN
PO BOX 5415
PHOENIX, AZ. 85010
(602) 947-2800

SAGUAROLAND BULLETIN

AUGUST-SEPTEMBER, 1978

SAGUAROLAND BULLETIN Editor, Lillian Diven

AUGUST-SEPTEMBER, 1978 Vol. XXXII No. 7

DESERT BOTANICAL GARDEN

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Cover: Pygmy Daisy, *Eriophyllum lanosum*
Photo by Barry Feldman

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ANNUAL MEMBERSHIP:
Individual . . . . . $ 15.00
Family . . . . . $ 20.00
Sustaining . . . . . $ 50.00
Benefactor $100.00
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LIFE MEMBERSHIP
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Educational Director . . . . . Sherry Krummen
Assistant . . . . . Christina Dezelsky
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Propagator . . . . . Victor Gass
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Published and owned by the Arizona Cactus and Native Flora Society for the Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. The Saguaroland Bulletin is published to disseminate information on the Garden and on desert plants and their culture. Issued 10 times a year.

EXECUTIVE BOARD: Chairman of the Board, John Rhuart. President, Mildred F. May. First Vice President, Henry C. Triesler, Jr. Second Vice President, Edward Burrall. Treasurer, Alice Feffer. Secretary, Barbara Kaiser.Margaret Caldwell, Thomas A. Goodnight, Donald W. Hutton, Naomi Kitchell, Lillian Mieg.

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News & Notes

A new name appears on the list of staff members on the facing page. Gary L. Shadle has just been appointed Assistant Director of the Garden. He has a master's degree in botany and comes to us with considerable experience from the Louisiana Nature Center in New Orleans, where he was Executive Director. We welcome Gary and his family to the Valley and look forward to working with him in the further progress that new ideas can foster.

As this is being written, page proofs for J. Harry Lehr's "Catalogue of the Flora of Arizona" have just been received. The book is being published by the Garden and printed by Northland Press, the distinguished enterprise based in Flagstaff. September 1st has been set as the date for delivery of the completed book.

Carol Sakato is a registered architect whose desert landscaping has been recognized in national publications. We are fortunate that she has agreed to teach a course here at the Garden this fall. Her plans are exciting — besides teaching basic desert landscaping design she will help students design practical landscaping for their homes. If you've admired good professional desert landscaping but haven't known exactly how to put the elements together, you'll welcome this course.

A prerequisite for the course is a two-session class on drought-tolerant plant materials, to be taught by Sherry Krummen and Victor Gass. It will deal with the sizes, colors, textures and care of the plants — **what** to use in desert landscaping. (These sessions may be omitted by experienced desert gardeners if they have permission from the instructors.)

Following a one-week intermission, Carol Sakato will hold six weekly sessions dealing with **how** to design your own desert landscape — design principles, mapping your yard or garden, and developing landscaping plans.

The plant materials classes will be held at 7:00 p.m. on Tuesday, September 26 and October 3. The landscaping classes begin at 7:00 p.m. on Tuesday, October 17 and run

(Continued on page 83)

The Garden's Lizards

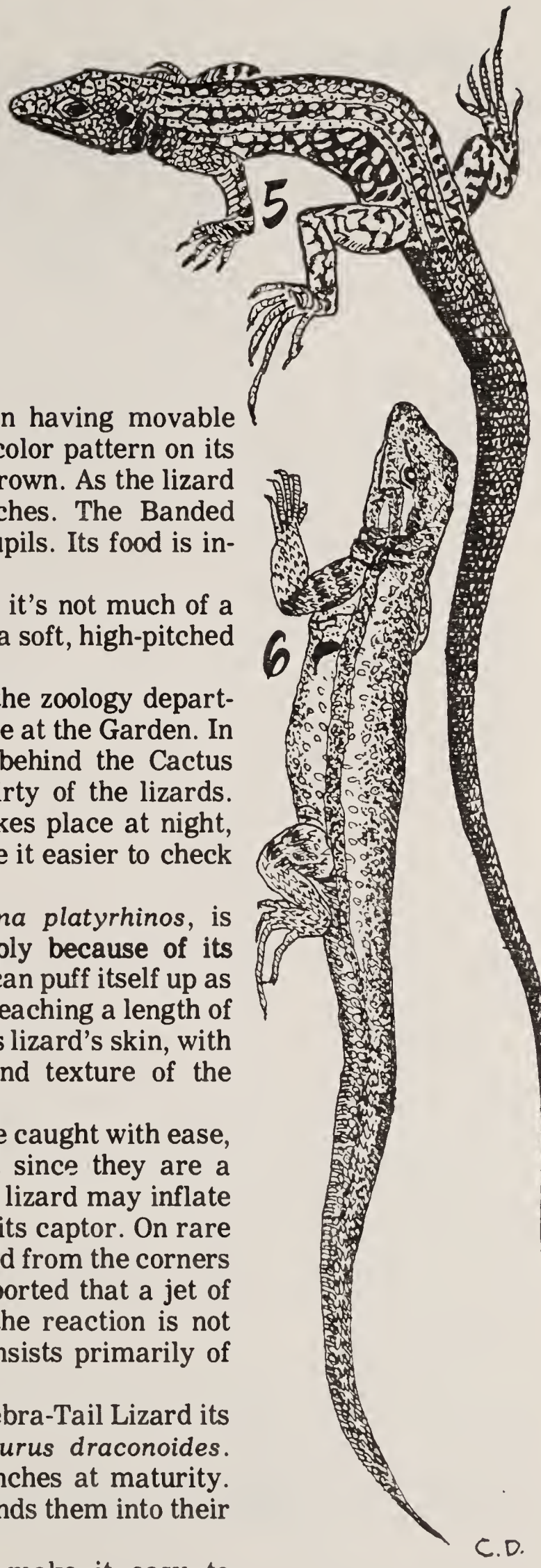
At least seven different species of lizards have been seen on the grounds of the Desert Botanical Garden. Winter visitors will probably see only one species, the Side-Blotched Lizard, since the others hibernate for varying lengths of time, but most of the species can be seen from April to December with a combination of close observation and a little luck.

1. A stocky, very scaly lizard is our Desert Spiny Lizard, *Sceloporus magister*. Reaching a length of eight inches, this wary lizard will be most often seen near dense shrubs in the Garden. It is a hard one to catch, seldom venturing far from its burrow (usually a ground squirrel burrow) beneath a bush. Its color scheme is a dusky brown over the entire body, with a bright blue patch on the throat and each side of the belly, and a distinctive black wedge-shaped mark on each side of the neck. The blue patches may not be present in females.

The Desert Spiny feeds on buds, leaves, insects and other lizards. It is primarily a ground dweller, but is an excellent climber, and can often be seen on joshua trees and mesquites. If it is caught, it will try to bite, and the bite can be painful, though not poisonous. (The Gila Monster is Arizona's only poisonous lizard.)

Desert Spinys weren't seen at the Garden prior to 1966. That year Shea Boulevard, north of Scottsdale, was extended seven miles eastward and the Garden was given the opportunity to salvage cactus along the right-of-way. Besides many truckloads of living plants, our staff also brought back saguaro skeletons to provide material for the long fence of saguaro ribs now stretching east of the Succulent Lath House. Our former Superintendent, John Weber, recalls that a number of Desert Spinys were brought in with the saguaro skeletons and apparently liked it here. The population has increased noticeably in the last twelve years and now this lizard is moderately common in the Garden.

2. Early in the morning you might see one of our night lizards, the attractive little Banded Gecko, *Coleonyx variegatus*. During the day it usually rests in burrows or under rocks and debris. Geckos are an essentially tropical family of lizards, and some of them have clawed toe pads that enable them to cling to walls and ceilings, where they do a fine job of killing insects that congregate around lights, but our Banded Gecko doesn't have toe pads and is largely a ground dweller, although frequently found clinging to



rough walls or screen doors. It differs also in having movable eyelids. It has soft, pliable velvety skin and a color pattern on its five-inch body of pale tan broken by bands of brown. As the lizard matures the bands may break up into blotches. The Banded Gecko's large eyes have distinctive vertical pupils. Its food is insects and spiders.

This is our only lizard with a voice, even if it's not much of a voice. When captured, the Banded Gecko emits a soft, high-pitched "eek".

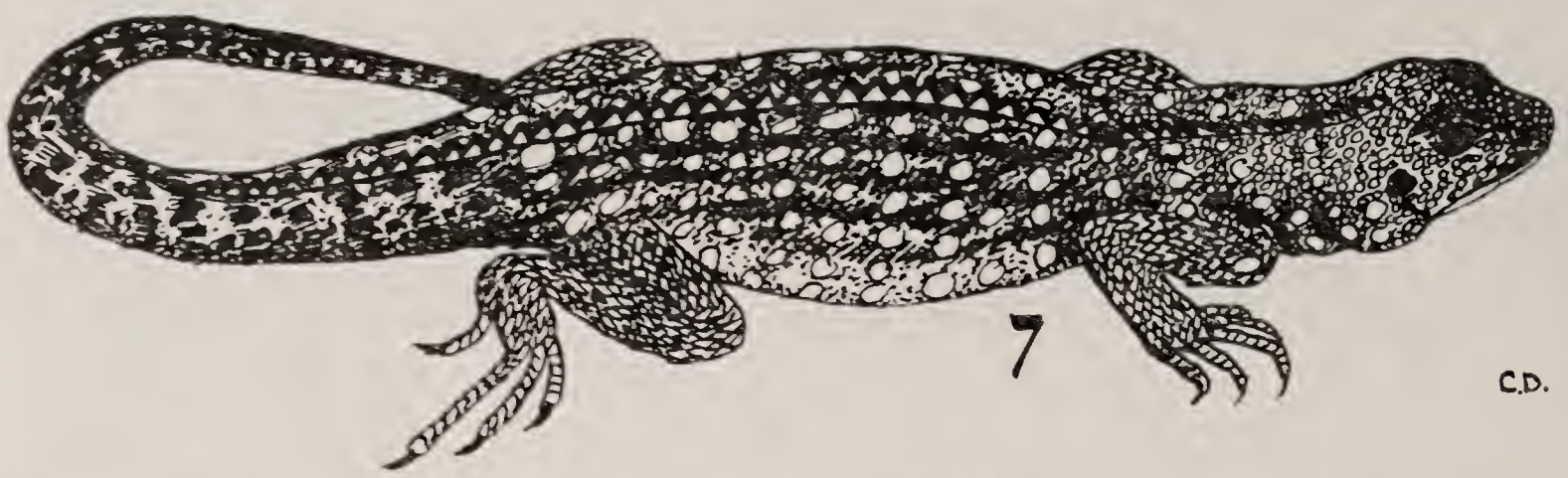
This year one of the graduate students in the zoology department at ASU is studying the Banded Geckos here at the Garden. In his study area of approximately three acres behind the Cactus House, he has trapped and released about thirty of the lizards. Since work with nocturnal lizards naturally takes place at night, they are marked with fluorescent paint to make it easier to check individual behavior.

3. The Desert Horned Lizard, *Phrynosoma platyrhinos*, is commonly called the "Horned Toad", probably because of its broad, squat shape, but perhaps also because it can puff itself up as a defense mechanism. It is a small, flat animal reaching a length of four inches from snout to the base of the tail. This lizard's skin, with blunt horns and spines, matches the color and texture of the gravelly soil of its habitat.

Desert Horned Lizards are slow, and may be caught with ease, but should not be removed from their habitat since they are a protected species in Arizona. When caught, this lizard may inflate itself by gulping air, and it may jab its horns at its captor. On rare occasions, a Horned Lizard may even spurt blood from the corners of its eyes to distract predators. It has been reported that a jet of blood has reached a distance of six feet, but the reaction is not easily induced. Food for the Horned Lizard consists primarily of ants.

4. The black and white tail bands give the Zebra-Tail Lizard its common name. Its scientific name is *Callisaurus draconoides*. These lizards reach a body size of up to five inches at maturity. They have a spotty, almost-white skin which blends them into their environment most effectively.

The behavior patterns of the Zebra-Tail make it easy to identify. It is one of our fastest lizards, capable of reaching a speed of 18 miles an hour, and runs with the tail curled over its back, but



when threatened it stands still and moves the tail back and forth to distract the predator. The tail movement may save the lizard's life by fooling the predator into striking at its tail instead of its head, and since the tail breaks off easily (as with other species) the Zebra-Tail Lizard can escape.

In mid-June the breeding season begins. Territories are established by the dominant males, who show off their colorful orange-yellow throat patches to all intruders.

5. Nearly as common as the Side-Blotched Lizard is the Western Whiptail, *Cnemidophorus tigris*. It can readily be identified by its unusually long tail, often more than twice the body length, bringing its total length to eight inches. A lengthwise pattern of white stripes and spots on a black background covers the upper surface of this lizard's body, excluding the tail, which is a solid ash-gray. Young Whiptails are often called "Blue-tails" because of the stroking bright blue tail color which lasts through the juvenile stage until the lizard reaches maturity at a length of about five inches. The Western Whiptail is conspicuous as it forages for insects on the desert floor, moving with a nervous, jerky gait and making frequent pauses to reconnoiter.

6. All year round, the Side-Blotched Lizard, *Uta stansburiana*, can be seen at the Garden. This common lizard does not hibernate for long periods during the winter — on any warmish day it is active on the grounds here. It is a small brownish lizard, reaching four inches in length. Identify it by the black blotches on each side of the body behind the front legs. The top of the body may be speckled with bright blue spots, but these are often absent.

The Side-Blotched Lizard is one of the most abundant in the Garden. It is a ground dweller and its food includes a wide range of animals such as insects, scorpions, spiders, mites, ticks and sow bugs. It would seem that this lizard (as well as some others) would be a first-rate gardener's aid in keeping the insect population down.

7. The big sandy-colored Desert Iguana, *Dipsosaurus dorsalis*, reaches a length of ten inches or more, but you won't see it too often because it is a shy creature and its camouflage is effective. It has a relatively small head and a line of short, sharp scales down the back. When it is not foraging for food it usually lives in burrows near the base of creosote bushes which offer shade as well as providing leaves, buds and flowers for food. Iguanas also eat insects, carrion and their own fecal pellets to supplement their vegetable diet.

I am afraid that most people don't find lizards particularly appealing, but the more one learns about them the more interesting they are. If you want to find out more about lizards, I recommend these very useful books: Reptiles and Amphibians of the American Southwest, by Heymann; A Field Guide to Western Reptiles and Amphibians, by Stebbins: and A Handbook of Lizards, by Smith.

——Barry Feldman

(Barry Feldman, formerly of the Garden's staff, is now a science teacher in the Kyrene School District.)

It's an Ocotillo? It's Not!

Visitors to the Garden who are slightly familiar with our native plants often guess that Pachypodiums are related to our Ocotillos because they have thorny branches. In fact, the two are not even closely related.

Pachypodiums constitute a very distinctive succulent group within the Apocyanaceae, the Oleander Family. The twenty or so species and varieties are found in Africa and Madagascar. They are distinguished from Adeniums, their close relatives, by having persistent or, in one case, deciduous stipular spines. Pachypodiums are stem succulents varying from squat caudiciform mimicry plants like **P. brevicaule** (when leafless it is scarcely visible in its native habitat) to thick-trunked and densely spiny two-meter-tall species such as **P. namaquanum**.

The genus was established by Lindley in 1830 to accommodate Thunberg's **Echites succulenta**, making the combination **Pachypodium tuberosum**. Candolle later resurrected the earlier Thunberg specific name, making the modern combination **P. succulentum**.

The Garden has had a specimen of **P. succulentum** in its collection for several years. The gray-brown caudex, 8 cm thick, produces a few weakly ascending branches, from the end of which a few pink oleander-like flowers appear from time to time. The plant is frost-tender and is kept in our small greenhouse which is reserved for plants requiring shade, high humidity, warmth in winter or cooling in summer. Having but one specimen, we have not risked placing it directly in the ground or in one of the lath house beds. Being potted in soil that permits good drainage and being allowed to go dormant during the winter seems to be the basic cultural needs of this curious plant.

P. succulentum is available from time to time as a selection of the International Succulent Institute which propagates plants and offers them for sale. This admirable enterprise allows collectors to acquire unusual plants without jeopardizing the existence of the plants in the wild.

The accompanying photographs are of **P. saundersii** N.E.Br. (**P. lealii** ssp **saundersii** Rowl.) and were taken in October 1977. They represent the first flowering of this species at the Garden. The flowers are diurnal, white and fragrant.

Flower structure is quite complex. The five anthers are fused into a point. They also have pouches at the base. The filaments have a ciliated hood. These last two features form a trap for the pollen as it is shed. The style is thrust through the bottom of this trap. It is assumed that the pollen is freed by the growing style pushing the pollen above the anthers.

These structures take a good deal of room, and a tumid section in the corolla tube has developed to accommodate them.

P. saundersii 60 cm tall, with a swollen base measuring 18 cm across.

Enlarged base of the corolla tube, shown here approximately half normal size.

Frilled edges of the scented, white flower of *P. saundersii,* nearly normal size.

This can be seen in the photograph showing a lateral view.

As the flowers are protandrous (stigma-receptiveness and pollen dispersal being temporally out of phase) self-fertilization is not accomplished. In any case, attempts at hand pollination failed when the same plant was both pistillate and staminate parent. We await the maturing of our second (seedling) specimen in order to attempt seed production again.

The flowers occur in terminal umbels of up to eleven flowers. The corolla tube is up to 4.5 cm long. The salverform limb may be up to 4 cm wide. One side of each section of the limb is crisped, giving the flower its ruffled appearance.

The plant itself is a succulent shrub 0.3 to 1 m tall, and has a swollen trunk. Paired stipular spines protect the relatively slender succulent stems.

Culture is similar to that needed for **P. succulentum**. Several other species are generally available and do well as house plants. Among these are **P. greayi** and **P. lamerii**. **P. brevicaule** is much more difficult to grow, as it is very sensitive to overwatering.

REFERENCES

Evans, Flowering Plants of Africa
Thistleton-Dyer, Flora Capensis
C&S Journal of America, Vol. XLVI, No. 5

——RGE

COME JOIN US —

As the Docent Program's first "graduating class," we're able to tell you that being a Docent is really satisfying volunteer work — and a lot of fun.

The training classes are great, we enjoy leading groups through the Garden, and each of us is also involved in a Garden Project.

Training classes this fall begin on October 25th — you'll find more details in the next Bulletin. Why don't you join us?

The Garden Docents

Water and Energy Conservation with Desert Landscaping

by William C. Ahearn

(Is desert landscaping really worthwhile? We believe Mr. Ahearn's careful record of his own experience will answer most of our readers' questions. He presented this paper at the Arizona-Nevada Academy of Science annual meeting at Flagstaff on April 15, 1978 and has given us permission to reprint excerpts in the Bulletin.)

INTRODUCTION

The W. C. Ahearns of Phoenix, Arizona have completed a four-year residential landscaping project that has reduced water consumption significantly without affecting energy usage. This is important in a time of higher energy costs and declining water supplies. Half of Arizona's residential water use is for landscaping, yet people have been reluctant to reduce thirsty lawns and plants for fear of increasing their already high air conditioning load.

The alternative, desert landscaping, in most people's minds, is bare ground or colored gravel and cactus, i.e. barren landscaping. This is extremely poor when considering energy conservation. The natural desert has trees, bushes, and wild flowers. The judicious use of these native and other drought-resistant plants can save water and energy.

BACKGROUND

The home had randomly scattered cactus, creosote bushes and palo verde trees with a variety of bushes, olive and pine trees around the house. However, the backyard was mostly dichondra lawn. Besides being rather dull, it was a struggle keeping the ill-suited lawn alive through hot summer sun or winter frost, or against attacks by insects and fungus. It was gradually reduced in size, then largely eliminated after two years. Two tree-shaded sections of lawn remain: only 30 percent of the original area.

RELANDSCAPING

At the same time, vigorous relandscaping was done throughout the property in keeping with the surrounding desert character. Decomposed granite, railroad-tie steps and walls, rocks and clusters of new plants emphasized the natural contours of the land and took advantage of rainfall runoff patterns.[1]

The flat lawn was replaced by a sunken circular firepit and seating area[2] affording a beautiful view of Camelback mountain.

While the number of cactus and succulents on the property increased by 50 percent, most effort went toward native vegetation once common in the Valley, and other drought-resistant plants. Their numbers increased nearly fourfold. Many areas were also seeded with wild flowers for additional spring color.

The lawn sprinkler system was modified and doubled in size to provide regular water to keep the foundation plants healthy and green, particularly around the house. Outlying plants are strictly Arizona natives. Once established, these don't need watering. They are occasionally helped by a hose or one-gallon jug to keep them looking green through prolonged dry weather.[3]

(Continued in the October Bulletin)

---

1 Dick Lambert, Landscape Architect, designed part of the front yard.

2 Basic design picked up from a Sunset magazine article, September 1973.

3 Another idea picked up from Sunset magazine several years ago. Put a small nail hole in the bottom of a one gallon plastic jug. Fill it with water and place it by a plant. The water trickles out in 15-30 minutes. No hoses to drag around and with the slow rate, water soaks deep into the ground rather than running off the surface. A portable drip irrigation system!

PRE-EMERGENT HERBICIDES

Because of the large amount of rain we got last winter, many of us with desert landscaping had quite a problem with such winter-germinating weeds as 7-day Grass (**Schismus barbatus**), Filaree (**Erodium cicutarium**) and Cheeseweed (**Malva parviflora**), to name just a few.

With the memory of all the hours of weeding that were needed to clear up our yards this spring still fresh in our minds, it is about time to start planning how to deal with next winter's weeds before they become a problem.

One of the great boons to modern horticulture is the pre-emergent herbicide, a chemical applied to the soil before weed seed germinates. The seed germinates normally, but is killed before it can emerge from the ground. The herbicide does not affect most other established plants. Two pre-emergent herbicides are commonly used in the Valley. One is Simazine. The other is dimethyl tetrachloroterephthalate, but its friends call it DCPA. Dacthol is a trade name for this herbicide.

DCPA is what the Desert Botanical Garden has been using. It is fairly effective in controlling most annual and perennial weeds and it is safe to use on or around most established plants except dichondra.

Apply pre-emergents to the soil before the weeds you are trying to control have germinated. For winter weeds (**Schismus**, Cheeseweed, and Filaree), early fall is a good time. For summer weeds such as Red Spiderling (**Boerhaavia coccinea**) or Spurge (**Euphorbia** sp.) treat the soil in early June, before the summer rains. One application is usually all you need.

Application is comparatively easy. DCPA is a wettable powder, and for large areas you should use a sprayer with an agitator to keep the powder in solution. For small yards it is easier to apply the herbicide with a watering can. After you apply the herbicide, water the area enough to equal one-quarter to one-half inch of rain in order to activate the chemical and leach the powder well into the soil. This can be measured by placing a straight-sided container in the path of the sprinkler and checking it periodically for depth of water contained.

Most pre-emergents will destroy 90 to 95 percent of the germinating weed seeds. However, there are always a few weeds that escape eradication. These you'll have to weed by hand or use a contact herbicide, but after a few years of using a pre-emergent you'll find your weed problems decrease, since fewer weed seeds will be produced each year.

One final point — if you wish to grow wildflowers in a particular area of your yard, don't use any pre-emergents. Chemicals do not distinguish between weeds and wildflowers.

Last winter's rains were unusual, but even in a "normal" year the use of pre-emergents will cut down on your yard work.

——R.A.H.

FALL FIELD TRIPS

We've planned six interesting field trips for the rest of the year. Decide well in advance which trips you'd like to join and make reservations. Space is limited and the more popular trips always fill up early.

HAIGLER CREEK — July 29 — About 130 miles from Phoenix, east of Payson, Haigler Creek is in the ponderosa pine zone. We'll see lots of summer wildflowers including columbine, monkey flower, wild geraniums and roses. There will also be watercress, wild grapes and other edibles for those who enjoy nibbling as you hike.

ARIVACA — August 26 — This area is southwest of Tucson and is about 170

miles from the Garden. We should see some different species of cacti including **Mammillaria gummifera, Echinocereus pectinatus** var. **rigidissimus**, and **Coryphantha vivipara** var. **bisbeeana**. We may also find the wild passion-flower that is native here, and summer wildflowers should be blooming.

FISH CREEK — September 30 — Out the Apache Trail about 50 miles from the Garden, Fish Creek should be a good spot for late summer wildflowers. We'll hike up the creek — which may take some scrambling over boulders. This is a beautiful riparian area with cottonwood and willow.

OAK CREEK CANYON — October 28 — We enjoyed last year's trip so much, we're repeating it — a little later, though, to see more fall color. The maples and sumacs should be a brilliant red and we should still be ble to see late wildflowers — asters, evening primrose, groundsel, wild geraniums, monkey flower and bee balm. Oak Creek Canyon is about 120 miles from Phoenix.

BOX O WASH — November 18 — East of Florence about 75 miles from the Garden. If we've had rainy weather, we'll stop at the wash to see what's growing. Otherwise we'll go a few miles beyond to an area abundant with cholla and prickly pears. There will be at least eight different species of **Opuntia** here to compare and learn.

ORGAN PIPE NATIONAL MONUMENT — December 9 — We'll be going down to Quitobaquito Springs on the Mexican border. There is a small natural lake here with interesting plants as well as good birding. Of course we'll be seeing many cacti including organ pipes, club cholla and senita. Quitobaquito is about 150 miles from Phoenix.

All field trips will leave the Garden's Webster Auditorium at 8:00 a.m. Several of these trips are rather far away and may last till late afternoon. You may want to make arrangements to stay overnight in the area. Participants travel in their own cars. Car-pooling and sharing of driving expenses are encouraged.

Wear comfortable, suitable shoes, bring water and a lunch that can be carried with you on the hike. Prepaid reservations are required. Fees are $1.00 for Garden members and $4.00 for non-members.

For more details about each area or alternate meeting sites, contact Sherry Krummen or Russ Haughey one to two weeks before the trip.

News & Notes (cont.)

through November 21. Enrollment will be limited, so early registration is suggested.

We are sorry to report the first loss of an exhibit from one of our Cactus Shows. Fran Tolleson, one of our outstanding exhibitors, was unable to locate two of her potted cacti after the show closed. She is really concerned about one of them, a **Mammillaria spinosissima** in a blue-glazed pot with a red rim. She is very anxious to have the plant returned. Doubtless it was picked up by mistake in the post-show scramble to get plants home again, and could be sitting incognito in someone's large collection. If anyone finds the plant, please phone the Garden or bring it in.

Our Docents gathered in the Garden's patio on June 28th for a "cookout and flower vigil" and a last get-together before activities resume in the fall. The Arizona Queen of the Night (**Peniocereus greggii**) was prophesized to bloom that evening but, unfortunately, the two most likely flowers bloomed the night before. Sherry Krummen, however, saved the night — she scoured the Arizona Flora Trail and found another night-bloomer, the Organ Pipe, ready to perform. Next year we must have either a more cooperative plant or a better prophet.

One-pound coffee cans (with plastic lids) are the best containers we've found for storing seeds at the Garden — and we have a lot of seeds to store. If you haven't switched to instant coffee, will you please save some coffee cans for us?

DESERT BOTANICAL GARDEN

P.O. BOX 5415
PHOENIX, AZ. 85010

Garden Events

AUGUST

WORKSHOP—BASICS OF FALL VEGETABLE GARDENING. Saturday, August 12th, 9:30 a.m. to noon.

CLASS—KEYS FOR PLANT IDENTIFICATION. An intermediate course in using botanical keys. 3 Wednesday sessions August 16th, 23rd and 30th, 9 a.m.

FIELD TRIP to Arivaca. Saturday, August 26th, 8 a.m.

SEPTEMBER

SPECIAL CACTOMANIACS MEETING ON THE 5TH.

All Garden Members are invited. Henry Triesler represented the Garden at the Succulenta '78 conference in Capetown, South Africa in July. He'll show slides of that "land of succulents" at the September 5th meeting at 8 p.m.

WORKSHOP—UNUSUAL CONTAINER PLANTS. New plants and ideas, plus a plant to take home. Wednesday, September 6th, 1:30 to 4 p.m.

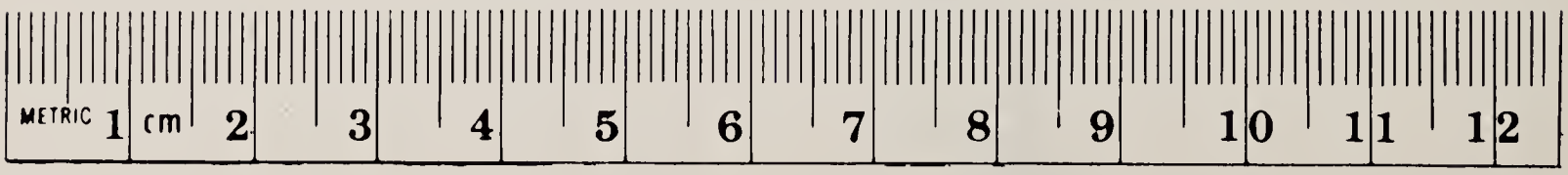
WORKSHOP—PLANT PROPAGATION. The Garden's propagator teaches how. Saturday, September 16th, 9 a.m. to noon.

CLASS—POISONOUS AND EDIBLE PLANTS. Two Thursday sessions and a Sunday field trip. Starts September 21st at 7 p.m.

FIELD TRIP—FISH CREEK. Saturday, September 30th, 8 a.m.

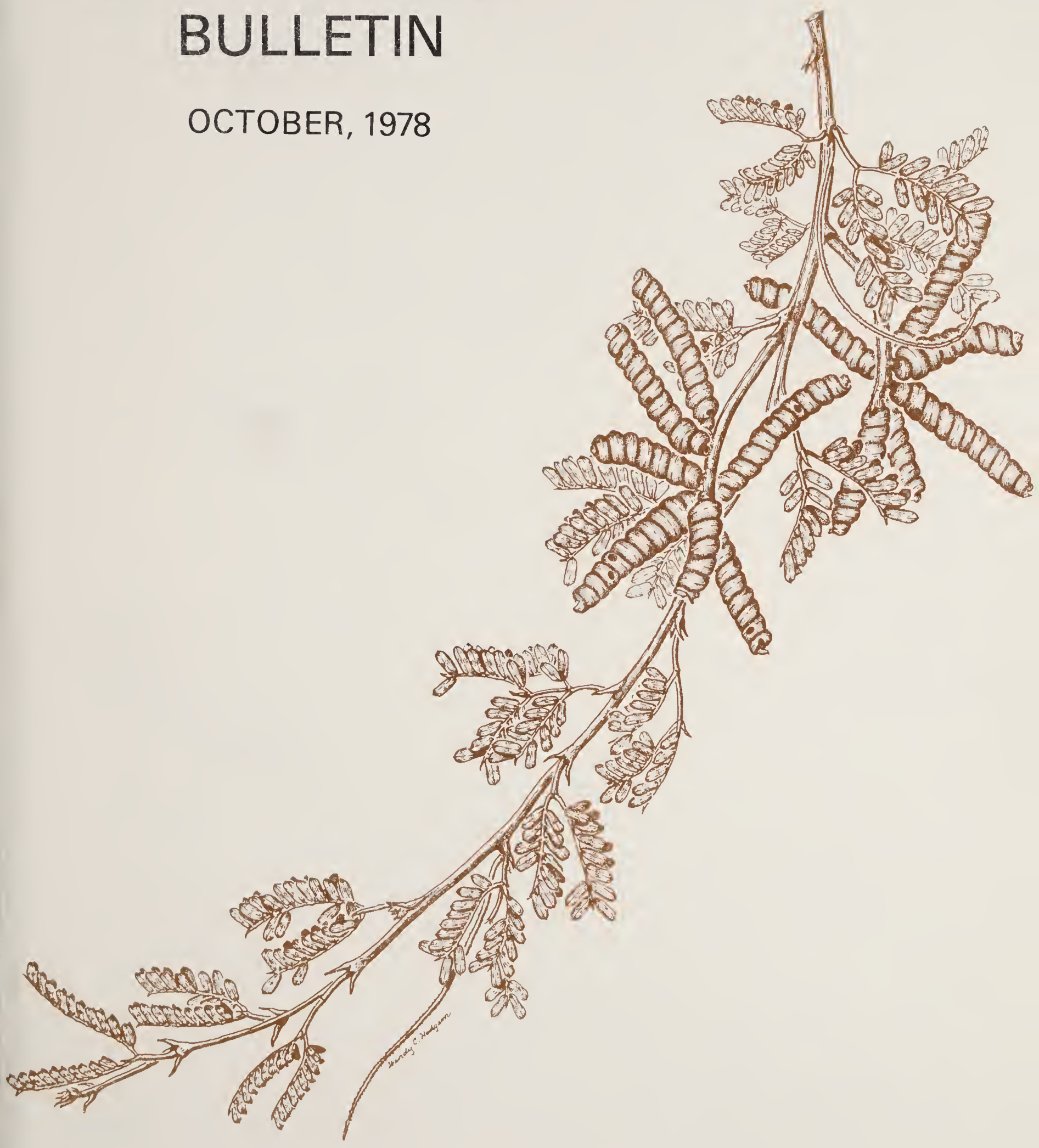
For class fees, field trip reservations and other information, telephone 947-2800 or 946-9942

The Garden is open every day of the year from 9 a.m. to sunset.



SAGUAROLAND BULLETIN

OCTOBER, 1978



SAGUAROLAND BULLETIN Editor, Lillian Diven

OCTOBER, 1978 Vol. XXXII No. 8

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Cover: Wendy Hodgson's drawing of the Screwbean mesquite (*Prosopis pubescens*) for the cover of J. H. Lehr's "Catalog of the Flora of Arizona"

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Published and owned by the Arizona Cactus and Native Flora Society, sponsors of the Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. The Saguaroland Bulletin is published to disseminate information on the Garden and on desert plants and their culture. Issued 10 times a year.

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News & Notes

The drawing of Screwbean Mesquite (Prosopis pubescens) which appears on the cover of this issue of the Bulletin is also on the cover of the Garden's newest publication, **A Catalog of the Flora of Arizona** by J. Harry Lehr, our herbarium curator. Because **The Flora of Arizona** was last revised 17 years ago it is now seriously outdated. There have been over 400 additions or changes in nomenclature since the last revision. Harry's book fills the growing need for an up-to-date source book on the flora of Arizona for it is a complete catalog of the state's flora as currently recognized. The **Catalog** is designed to serve both as a ready field reference and as a bibliographic guide to the recent literature. Harry plans to keep his book current by publishing new taxa and bibliographical entries in the **Journal of the Arizona-Nevada Academy of Science.** You can buy your own copy of **A Catalog of the Flora of Arizona** in the Garden's bookstore or you may order it by mail. Either way the price is just $4.75.

* * *

Garden members are cordially invited to attend the opening of the Second Botanical Art Show from 7:00 to 9:00 p.m., October 5. If you can't make it to the opening be sure to drop in sometime between 9:00 a.m. and 5:00 p.m., October 6 through 15. The show this year will feature more contemporary works than last year's thanks to the publicity our show received from the Guild of Natural Science Illustrators. This year the show promises to be a perfect blend of art, history, and plants.

* * *

Four Soviet scientists toured the Garden on Labor Day. The visit was part of an exchange program for scientists studying the use of plants for pollution abatement. In addition to the Deputy Minister for Forestry and a chemist specializing in the study of pollution, the group included two botanical garden directors: Dr. V. A. Alexeyev from the Leningrad garden and Dr. Juri Martin from Tallinn Garden in Estonia. Both gardens have large collections of cacti under glass (600 taxa at Leningrad and 800 at Tallinn) but none of the visitors had seen pressed cactus specimens before. Our herbarium collections of dried cacti were therefore of particular interest. Victor Gass, our propagator, speaks Russian and his linguistic skill helped to make the meeting more interesting and useful. Our treasurer, Alice Feffer,

(Continued on page 93)

A Traditional Cholla Bud Roast

by Ruth Greenhouse and Christine Brown

The brightly-colored flowering chollas have been an important food source for the Pima and Papago Indians of southern Arizona for centuries. Their abundant buds are thought to have constituted a staple in the diet of these and other Southwest Indians. Reference to the use of cholla buds can be found in many of the ethnographic works written in the first half of this century, including those of Curtin 1949, Russell 1908, Castetter and Bell 1942, and Castetter and Underhill 1935. There is also archeological evidence that cholla buds were used for food by the prehistoric Hohokam Indians. Cholla seeds, pollen, spines, and buds have been recovered from excavated roasting pits and trash mounds (Gasser, 1976).

Although many of the younger Pima people on the Gila River Indian Reservation have tasted cholla buds, only the older or more traditional people still gather them each spring. The most common contemporary method for preparing cholla buds is to boil them, dry them in the sun, remove the spines from the dried buds, and reboil them when needed. But the traditional method, and by most the preferred method, is to roast them in a pit oven. In the past, the dried buds were usually stored in large clay vessels for the winter. Even now, it is not unusual for the buds to be saved from one spring to the next, just to ensure that this highly relished food is available when desired. Traditionally, prepared cholla buds were served as the main course in a meal along with pinole, a gruel. Today, they are served mainly as a vegetable or in a vegetable stew.

In April 1978, a traditional cholla bud gathering and roasting party was organized for the participants in the Elderly Feeding Program of District No. 5 on the Gila River Indian Reservation. Besides providing an enjoyable outing for the elderly, it was hoped that some of their knowledge regarding the use of native foods could be learned and preserved for future generations. Many of these people had not been able to gather buds for decades because of lack of time, lack of transportation, lack of interest by younger family members, or poor health. Needless to say, the idea of such an outing was eagerly accepted, and arrangements commenced. Our group of twenty was perhaps slightly larger than parties of the past when cholla bud gathering was usually a family project.

Wooden tongs called *va-o* are used to pick the cholla buds.

A location with an abundant supply of cholla was chosen, the foothills of the Estrella Mountains near St. Johns. There grows the Buckhorn Cholla, called **hannam** by the Pima, **Opuntia acanthocarpa major**. On the day we went out, many cactus were still in bud, but there were also quite a few yellow or copper blossoms. The best time for picking, we were told, would have been two weeks earlier, before the cactus were blooming. Then more buds could have been picked from each cactus and we would not have had to spread out so far. Although the opened flowers are also

edible, most Pimas agree that their texture is stickier than that of the unopened buds.

Most of the women used metal kitchen tongs to pick the buds, but a few had wooden tongs called **va-o**. These are either carved from a forked mesquite branch or made from two saguaro ribs tied together. The buds are grasped and easily twisted off with this tool. The women with prior experience warned us to throw a little soil in the air first, to see the direction of the wind, and then to stand upwind, so that the cactus spines were blown away from us as the buds were picked.

We spent the morning picking, one or two women to a cactus, and by noon had picked almost two bushels of buds, or **hannam**. After a break for lunch and then a few more hours of picking, we returned to Bapchule where the men dug a large pit, 3 feet across and 1½ feet deep, with sloping sides. While we had been picking, some of the men had gathered mesquite wood and a pile of river rocks. After the pit was dug, one of the men quietly chanted as he lined the bottom and sides of it with the river rocks. The chant may be compared to a grace or a blessing.

A large fire of mesquite wood was built in the pit and allowed to die down to burning coals. At this point the rocks were quite hot and would retain the heat a long while. The day before, one of the women had gathered a supply of **chuchk onk** (which means black salt), **Suaeda torreyana**, a salty shrub of the Chenopodiaceae. A layer of it was carefully placed on the bottom and sides of the pit, forming a sort of shallow basket. It steamed as it was laid down. Its purpose appears to be threefold: it protects the **hannam** from the coals and dirt, steams the **hannam**, and provides flavor. Next the **hannam** was spread on top of the **chuchk onk** (Suaeda) and another layer of the **chuchk onk** covered the **hannam**. A canvas was placed on top and finally soil placed on the canvas and tamped down so that no steam could escape.

The day's work done, the **hannam** was left to bake for about 18 hours. The next day the pit was uncovered and its contents carefully removed so as not to push any of the spines into the now soft and moist, cooked **hannam**. At this point, the spines could easily be pulled out for those who wished a taste. The taste is like sour asparagus and the texture is similar to that of artichoke hearts. The **hannam** was then spread on a screen to dry in the sun for one week. When it was dry, the spines were removed by rubbing the buds over the screen with sticks, stirring them in baskets, and winnowing. Now the **hannam** could be stored indefinitely.

When **hannam** is eaten, the roasted buds are soaked in warm water to rehydrate. As they swell, any remaining spines can be seen and plucked off. Then they are boiled until tender, usually with a green called **onk ivakhi** (which means "salty greens"), **Atriplex wrightii**. The young shoots of this saltbush are available in April and are often dried and saved to cook with **hannam**.

Buds of other species of cholla may be prepared similarly but are said to differ somewhat in taste. **O. versicolor, O. fulgida, O. arbuscular,** and **O. spinorsior** are used. In Piman or Papago these species may be called **hannam, cheolim,** or **vipenoi**.

Cholla buds have been analyzed for their nutrient content. They have been found to be especially high in calcium, comparing quite favorably with a more familiar calcium source, milk. It is not known whether cholla buds contain oxalic acid which may prevent the absorption of calcium. Cholla buds are quite low in protein, carbohydrates and fat (and therefore calories), as are most green vegetables.

Many other desert plants have been utilized for food by the Pima Indians, and there is much about them which can be learned from the elderly on the Gila River Indian Reservation. Thus far we have studied two types of "wild spinach" **Monolepis nuttalliana** and **Atriplex**

wrightii, Lycium berries, and cholla buds. We plan to continue our studies through the seasons to learn about other edible desert plants.

Ruth Greenhouse is a graduate student in nutrition at Arizona State University. Her research involves a nutritional analysis of native plants which have been utilized for food by the Pima Indians.

Christine Brown, a Pima, is Citizen Participation Advisor for the Gila River Indian Tribe. She works with the elderly on the reservation and encourages them to teach the younger generation how to utilize desert resources.

"ARID"-zona Beautiful Awards

City of Scottsdale landscaping

The "ARID"-zona Landscaping Awards Program sponsored by the Desert Botanical Garden and the Salt River Project closed in September with the recognition of those entries judged best in terms of landscaping design and in the use of drought resistant plants. First places went to: the Phil Hebets and Gaylon Coates homes, Private Residential class; Sentry Life Insurance Company, Commercial; Taliesin West, Educational; Honeywell, Industrial; and the City of Scottsdale, Municipal.

Coates Residence

Hebets residence

The Genus Pereskia

Pereskias are broad-leaved plants, sometimes deciduous, ranging in size from shrubs to tall trees. Some are vine-like, all are spiny. Those that are shrubby would perhaps remind you of a Hawthorn, the vine-like varieties somewhat resemble the Ocotillo, and those that grow to tree size (up to 40 feet) look like nothing else in the world. On closer inspection, however, something familiar to readers of this Bulletin would become apparent. The spines of these plants arise from an areole and betray Pereskias as true cacti, though nothing about the plants appears at all succulent.

Pereskias are antique plants. They are regarded by most authorities as the first cacti, transitional between their unknown predecessors and the more familiar forms. In a glacial age with conditions of increasing dryness, certain plants evolve or face extinction. In those regions inhabited by Pereskias, the drying was not so great, and less severe adaptations were needed to insure survival. In other areas where the drying was more severe, evolution resulted in more dramatic adaptations within the Cactus Family. Nowadays Pereskias can be found in areas of moderate rainfall in Mexico, South America, and the Caribbean.

The genus is characterized by a combination of features — areoles without glochids (a later adaptation in the family), evergreen or deciduous broad leaves in various shapes, flowers borne on stalks singly or in groups, and stems becoming woody after the first year.

Pereskias have caused both botanists and non-botanists a great deal of confusion. They have been mistaken for Bouganvillea, and have, in the past, even been classified with Portulacas and Apples (**Malus**).

Of all the species of Pereskia, **Pereskia aculeata** has been the most commonly cultivated and is today one of the easiest to obtain. It is a vine-like Pereskia having white or yellow-tinted flowers and yellow spiny fruits. The flowers are strongly scented — some people find the odor pleasant, like lemon, but others find it offensive.

P. bahiensis. From an original 1915 drawing by M.E. Eaton in the Garden's collection.

P. aculeata has several common names, Barbados Gooseberry and Rose Cactus being the best known. It has a winter dormancy period during which it sheds its leaves. In the West Indies and elsewhere the fruit is eaten, and in Brazil the leaves are used as a flavoring herb in stews.

Pereskias can be grown in Arizona, but most species are very frost-tender and should not be tried except in a very protected area or under glass. **P. aculeata** and **P. pititache** are only moderately frost-tender and ought to overwinter successfully if given some protection. Keep Pereskias dry in the winter. This is their dormancy period, and rot and frost

damage can result from overwatering. Otherwise they like more water than the more xerophytic species of cactus and can very nearly be treated as a woody shrub if you are certain that the drainage is good.

Soil consistency that is good for desert species of cacti is fine for Pereskias. It is a good idea to enrich the soil somewhat with organic matter, because in nature Pereskias are accustomed to a higher organic content than is common in the soil of arid areas. Pereskias do best with some light shading from the most intense summer rays. Varieties with multi-colored leaves (**P. godseffiana**) should always be partially shaded to prevent fading of colors and sunburn.

On the whole, Pereskias are easy to grow, but there are a few problems you should be alert to. A soil low in nutrients can cause yellow leaves and retarded growth. A lack of potassium can cause yellow spots with black edges to appear on the leaves, although this is unlikely in Arizona because of our high-potassium soils. As with other cacti, beware of mealy bugs, and, in the greenhouse, watch for scale problems. If you have an evergreen Pereskia that drops its leaves in cool weather, take immediate steps to protect it from further chilling.

Pereskia cuttings can be rooted in sand during warm weather. Pereskias can also be germinated from seed planted as soon as possible after the seed ripens. **P. aculeata** is used as stock in grafting cactus, principally with **Rhipsalis, Hatoria, Schlumbergera,** and **Zygocactus** as scions.

In the landscape Pereskias are used principally as specimen plants. The vine-like **P. aculeata** can be trained on a trellis or formed into an espalier. In its native area it is also used to make an impenetrable hedge. A tree Pereskia, **P. pititache**, might be grown in this area as a specimen tree, since it can resist frost if protected. It presents an unusual appearance, growing up to 42 feet with branches emerging from a spine-covered trunk at a ninety-degree angle.

Pereskias are not the most easily procured cacti, but nurseries in California and Arizona have been known to offer them. By no means are all the species available, and not all can be grown here, but seek and ye shall find! I feel that the Pereskias are definitely worth a try.

——P.Q.

Docent Training Class

Want to learn more about desert plants and about your Botanical Garden? This fall you will have an opportunity to attend free classes — ten of them — and be assured of eight advanced classes each year after you finish the course. All of this plus many informal learning experiences will be yours when you become a Garden Docent.

As a Docent you will select the job that is just exactly right for you, anything that needs doing at the Garden from conducting tours to potting plants. The hours of work are short, just sixteen hours per month from October to May including your travel time and the time you spend in the advanced classes. You'll receive "wages" from your job as Docent every day for the rest of your life. They will include expanded interests, increased knowledge, new friends, and a multitude of enriching experiences. There's even a bonus that goes with the job and it's not just one you receive once a year. This bonus you will enjoy every day, for it's the satisfaction that comes with doing a highly skilled job that's very much needed and very much appreciated.

Classes begin Oct. 25 and graduation day is Jan. 17, with time off during the holidays. You will learn about the history of the Garden and what's going on at the

Garden now. You will tour the grounds and the buildings. Basic botany, how to care for desert plants, and specific information about plants now in the Garden will be included in the course. You will have reading assignments and there will be quizzes so that you will be certain you've got all the facts exactly right. Toward the end of your course you will have an opportunity to conduct practice tours.

Although most Docents do conduct tours there are plenty of other interesting things to do if guiding groups through the Garden just isn't for you. Some Docents have found their own special projects in the shop, the propagation area, and in the library. Others develop educational activities such as children's workshops or help with the shows that are held at the Garden. Your skills and interests will guide you to that special spot that is just right for you.

To become a Docent you need only be a Garden member, attend the ten training classes, agree to help at the Garden sixteen hours per month, and attend at least five of the eight advanced classes that will be offered each year.

To reserve your place in the Docent class and enjoy lots of exciting experiences, call 947-2800 or 946-9942.

BOOK REVIEW

THE ILLUSTRATED ENCYCLOPEDIA OF SUCCULENTS, by Gordon Rowley. 1978, Crown Publishers, N.Y., N.Y. $14.95 at the Garden Bookstore or $17.00 postpaid in the continental U.S.

This is a book that is bound to become a best seller. As most of us know the increasing interest in succulent plants has resulted in a plethora of pseudo-experts, a proliferation of colorful coffee table books, and an abundance of handbooks. However, it was the greatest pleasure to find a copy of **this** new book on succulents in my mail one morning. Anything Gordon Rowley writes is worthy of your attention for the clarity of his literary style alone. In this book every page except the bibliography, glossary, and index is alive with excellent color photographs. The test is as impressive as the illustrations. There are short introductory chapters on such subjects as morphology, pollination, evolution, cultivation, conservation and nomenclature. These are followed by discussions of the plant families that contain most of the world's succulent flora. Errors are few and far between. *Agave schawii* is reported to rarely offset and to propagate itself entirely by seeding. My information would indicate that just the opposite is true. However Gordon may have found a population such as he describes for Agaves are extremely variable in this respect.

I cannot overestimate the value of this book to collectors. It is an exceptionally fine introduction to the biology of the plants that they avidly seek. The large format and the extensive use of color photographs make this one of the great bargains of the year.

—RGE

News & Notes (cont.)

represented the board in welcoming our guests. Now, somewhere in the Soviet Union there are four proud wearers of Desert Botanical Garden T-shirts.

* * *

There are still a few places left on the Huntington Plant Sale Safari. If you haven't made your reservations yet call 944-2594, Southwest Convention Service. The trip is Nov. 3, 4, and 5 and includes three famous southern California botanical gardens and the Huntington Garden plant sale. This sale offers something from nearly every plant category in the world.

Soviet Scientists Visit The Garden

Soviet scientists viewed the Garden's collection of pressed cactus specimens during their Labor Day visit. On the left are Dr. Alexander Salov and, behind him, N.M. Prilepo. On the right, back to front are: Dr. Juri Martin, director of Estonia's Tallinn Botanical Garden, Dr. V. A. Alexeyev, director of the Leningrad Botanical Garden, and Rodney Engard, Desert Botanical Garden.

Water and Energy Conservation with Desert Landscaping

by William C. Ahearn

(Continued from the August-September Bulletin)

WATER-ENERGY CONSUMPTION

Water consumption dropped 33 percent in the two summers following the major lawn reduction as compared with the first two summers, despite the great increase in plants. From summer one (1974) to summer four (1977) water consumption dropped an impressive 47 percent,[4] even though the summer of 1977 was the hottest and one of the driest in the history of Phoenix. This emphasizes that lawns are large water consumers as compared to bushes and trees.

Energy usage was virtually identical in both two year periods, however, contradicting the common belief that lawns act as evaporative coolers for a home, thereby reducing summer energy consumption. What cooling the dichondra lawn did provide was quickly blown away by the wind.

More important and practical in the desert is the use of trees and bushes to shade a home's walls and roof from the radiant heat of the sun and good insulation — conditions that existed when the home was purchased. Our State trees, the Blue and Foothills Palo Verdes, are excellent for shading buildings since they are thick in summer and thin in winter.

Household habits, vacations, and dry weather conditions were comparable in both two year periods.

Winter water consumption dropped 32 percent after the dichondra was removed.[5] With normal winter rainfall, the drought-resistant plants have needed no extra water to exhibit good growth. Winter rains have also brought up large areas of wild flowers on the property.

Energy consumption dropped sharply because of warmer winter weather.

FUTURE SAVINGS

Water savings should be even greater next year as the new plants develop deep root systems. They will not require the frequent summer waterings of younger plants trying to get established.

The dichondra is being overseeded with lippia, a more drought-resistant ground cover.

Use of drip irrigation in place of the plant bubblers could make the water system more efficient.

OTHER BENEFITS

Native landscaping has advantages besides water conservation. It requires little care and is less susceptible to insects and disease. It provides a home and food for desert birds,[6] ground squirrels, rabbits and an abundance of lizards.

AVAILABILITY

Several years ago native and drought resistant plants were almost impossible to obtain commercially. With increased interest in water conservation in landscaping, several local nurseries now regularly stock native and drought-resistant plants.

ECONOMICS-DIRECT SAVINGS

Studies have shown that native and drought-resistant landscaping is cheaper to install and maintain.

Conversion of existing landscaping is a different matter. A simple conversion of a lawn — removing sod by oneself, adding decomposed granite and plants — would cost up to a hundred dollars. Refinements, such as the firepit area in this study, added several hundred more dollars. Professional landscaping could exceed a thousand dollars.

In this study approximately 8500 cubic feet of water are being conserved yearly. But with the artificially low cost of water in Phoenix and the Salt River Project area, this represents an annual savings of only $22.00.[7] Outside this area water is more expensive due to ground water pumping, and dollar savings would be higher for the same amount of water. More significant than water is the savings of fertilizer, lawnmowers or a mowing service, and personal time.[8]

Water costs will certainly rise in the future with the expected higher price of the Central Arizona Project water, inflation, etc. Until then, relandscaping can only be justified financially by desert-lovers and conservation-minded citizens.

CONCLUSION

The study has shown that native and drought-resistant landscaping can conserve considerable amounts of water as compared to lawns, without any adverse affect on energy consumption. It should be used whenever possible in new construction. Relandscaping is not financially advantageous for individuals however, and is likely to remain that way without changes in government policy and water pricing.

---

4 Based on total water usage. If indoor use of 400 cu. ft. per month is assumed, outdoor landscaping water consumption dropped 39 percent and 55 percent respectively.

5 Based on total water usage. If indoor use of 400 cu. ft. per month is assumed, outdoor landscaping water consumption dropped 59 percent.

6 Fifty-four species observed, such as quail, cactus wrens, thrashers, woodpeckers, doves, mockingbirds, and even hawks.

7 Direct water use charges, City of Phoenix, 25.5 cents per 100 cubic feet. Actual cost is higher because of indirect water taxes and SRP's $13 million subsidy of water delivery costs with electrical revenues, but these savings could not be realized through water conservation.

8 A friend, wet with sweat while fertilizing his lawn on a particularly hot day, observed, "I can't believe I'm out here trying to get it to grow better so I can mow it next week." Especially since his lawn, like many residential, commercial and governmental lawns is never walked on except to do these maintenance chores.

DESERT BOTANICAL GARDEN

P.O. BOX 5415
PHOENIX, AZ. 85010

Garden Events

OCTOBER

CLASS — PLANT DRAWING FOR BEGINNERS. 4 Thursday sessions. Starts October 5 at 9:30 a.m.

MEMBERS' PREVIEW OF BOTANICAL ART SHOW. October 5, 7 to 9 p.m.

SECOND ANNUAL BOTANICAL ART SHOW. An exhibit of botanical prints and originals from the 17th to the 20th Century. 9 a.m. to 5 p.m., October 6-15.

WORKSHOP — USEFUL DESERT PLANTS. Two consecutive evening sessions starting at 6:30 p.m., October 18-19.

CLASS — DESERT GEOGRAPHY. Locations, characteristics, and relationships of the world's deserts. Two Saturday sessions. Starts October 21 at 10 a.m.

DOCENT TRAINING CLASSES. Ten weeks of intensive learning. After graduation docefts lead tours of the Garden and help with special projects. Starts October 25 at 2 p.m.

FIELD TRIP — OAK CREEK CANYON. Saturday, October 28, 8 a.m.

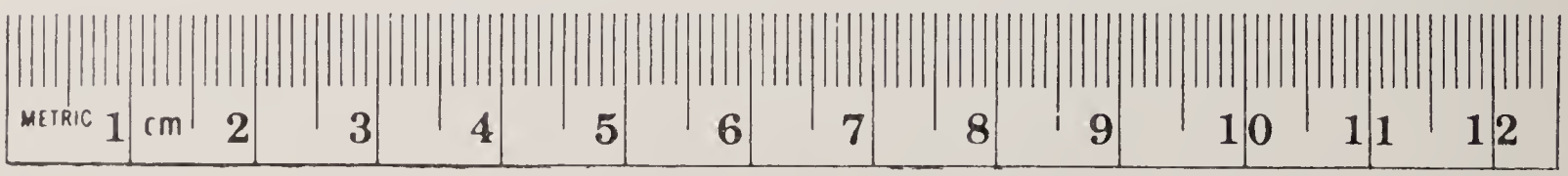
CLASS — WHAT IS A DESERT& An introduction to deserts, desert plant life, and desert landscaping. 5 Monday sessions and 1 field trip. Starts October 30 at 2 p.m.

NOVEMBER

FIELD TRIP — BOX O WASH. Many different prickly pears and cholla cactus. November 18 at 8 a.m.

For class fees, field trip reservations and other information,
telephone 947-2800 or 946-9942

The Garden is open every day of the year from 9 a.m. to sunset.



SAGUAROLAND BULLETIN

NOVEMBER, 1978

SAGUAROLAND BULLETIN Editor, Lillian Diven

NOVEMBER, 1978 Vol. XXXII No. 9

DESERT BOTANICAL GARDEN

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Published and owned by the Arizona Cactus and Native Flora Society, sponsors of the Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. The Saguaroland Bulletin is published to disseminate information on the Garden and on desert plants and their culture. Issued 10 times a year.

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News & Notes

The Garden's 1979 Index Seminum, the seed list we exchange internationally with other botanical gardens and research units, has just been mailed out, and soon we'll start receiving requests from all over the world for seeds we have collected in the wild here in Arizona and in Mexico and from plants cultivated in the Garden. Tempting as this may sound to gardeners, we regret that we can't share our "loot" with you. Amounts are generally too small for all but botanical purposes. There are 62 species on the new list, all annotated for the information of serious botanists. And not only botanists — a recent request was from an archaeologist who needed identified native seeds to compare with those found on a prehistoric Indian site. As a reference collection, the seeds will help determine plant distribution and use in Arizona centuries ago. The Index Seminum isn't a newsworthy thing in the usual sense, but it is an important activity of our Garden.

* * *

And speaking of seeds, Board Chairman John Rhuart, just returned from visiting private and botanical gardens in Southern Africa, has given the Garden a generous check to increase our plantings of the wildflowers of that area, much more varied and exciting than the African Daisies we're so familiar with. Wait until you see them next spring!

* * *

And still speaking of seeds — and other plants — the new propagation area "nursery house" is nearly ready for our plant propagator, Victor Gass, to move into. The picture on page 104 shows it almost ready for the double layers of plastic film roofing. It's 14 ft. wide and 52 ft. long, is wired for controlled cooling and heating, and opens new areas of plant growing and testing.

* * *

Last summer's request for coffee cans in which to store seeds drew such an enthusiastic response that this column has been asked to say "Please, no more." Marc Mittelman, who made the request, estimates he now has a five year supply. Thanks to all coffee drinkers who helped us.

* * *

Whether you can believe it now or not, the holidays are coming. As usual, the Garden Bookshop is a great place to shop,

(continued on page 104)

A REVIEW OF THE FOUQUIERACEAE

by Wendy C. Hodgson

The Fouquieriaceae are a small family restricted to arid portions of Mexico and southwestern United States, ranging from western Baja California, northern Arizona and eastern Texas to southeastern Oaxaca. Species of northern Mexico and the United States occur primarily in desert habitats with an average annual precipitation of 50 to 350 mm. These species are *Fouquieria columnaris* (Boojum Tree), *F. burragei, F. diguetii,* and *F. macdougalii*. Five species of southern Mexico, *F. leonilae, F. ochoterenae, F. purpusii, F. fasciculata,* and *F. formosa* occur primarily in arid parts of tropical deciduous forest and arid tropical scrub with an average late summer precipitation of 400 to 700 mm. The widest ranging species of the family is *Fouquieria splendens* (Ocotillo) extending from the Sonoran Desert of Baja California and Sonora through southwestern United States to the Chihuahuan Desert, in regions with an annual average precipitation of 40 to 500 mm.

Ocotillo, F. splendens. *Note growth form with ascending stems from a short trunk, shared by F. shrevei.*

The family consists of species with growth forms varying from shrubs to small trees, 2 to 8 (sometimes 16) meters tall, having very short to large woody or succulent trunks, and bearing spinose branches. The inflorescence may be produced at the tips of the branches (terminal) or along the branches (axillary) and is composed of flowers with fused petals, their color ranging from white to cream-yellow to scarlet red or dark maroon. The fruit is a capsule with broad, winged seeds.

The first comprehensive taxonomic treatment of this family was done by G. V. Nash, in 1903. He recognized two genera, *Fouquieria* and *Idria*, the former consisting of seven species, and the latter of two.

James Henrickson did intensive work on the morphology, anatomy, cytology, and ecology of the family and published a monograph in 1972. As a result of his work, a great deal more is known about this unique family.

Henrickson (1972) recognizes only one genus within the family, *Fouquieria*, comprised of 11 species. The shrubby to small tree form that has one or more basal trunks bearing lateral stems is the basic growth form. The species with this growth form are *Fouquieria ochoterenae*, *F. leonilae, F. macdougalii*, *F. diguetii*, *F. burragei*, and *F. formosa*. The familiar growth form is that of the Ocotillo, *Fouquieria splendens* and *F. shrevei*, having a reduced stocky trunk with straight, wand-like stems. A different and interesting growth form is represented by *F. fasciculata*, *F. purpusii*, and the Boojum Tree, *F. columnaris*. These 3 species have trunks composed of succulent tissue, the extent of succulence depending on the species.

F. ochoterena. *Note primary leaves and spine formation on right stem, secondary fascicled leaves on left.*

F. macdougalli's *corymbose inflorescence. Note slender pedicels and tubular corolla with erect lobes.*

Table 1 summarizes some characters of the members of the Fouquieriaceae with their respective distribution modified after Henrickson (1969, p. 105).

There are many unique features within the Fouquieriaceae, one of which is the method of leaf and spine development. Although this will not be dealt with in great detail here (one should refer to Henrickson 1969 a, b and Henrickson 1972), their importance to the survival of a plant in arid environments will be considered.

The casual observer has probably noticed the presence of leaves on an ocotillo soon after rain. Production of these secondary leaves can take place within 48 hours following rain (Darrow, 1943). To understand this phenomenon, one should be familiar with the terms "long shoots" and "short shoots", both of which are produced by all species of the Fouquieriaceae. Long shoots produce the first or primary leaves and have long petioles. It is these leaves that become the familiar spines. Associated with the long shoots and primary leaves is elongation of the plant's main stems (thus, the term "long shoots").

Short shoots produce secondary leaves that are fascicled at each node as a result of little or no stem elongation. It is these leaves that can be produced within 48 hours following rain. A small amount of energy is expended in the production of these short shoots compared to the great amount of energy expended in the production of long-shoot leaves. If moisture is insufficient, short-shoot leaves (secondary leaves) will abcise. However, following adequate rainfall, new series of leaves are quickly produced and carry on the bulk of photosynthesis. The advantage of short shoot production to plants whose growth is governed by limited precipitation becomes apparent. The short shoots can produce a series of leaves without having to produce a stem, thereby enabling the plant to take advantage of

F. burragei *is an arborescent species with small, open white flowers.*

brief periods of rainfall. The plant has a greater gain of photosynthates than if both leaves and branches were produced. Production of leaves with branches requires more energy over a longer period of time, a situation detrimental to plants inhabiting areas experiencing few, brief rain periods.

Pollination within the family Fouquieriaceae is reported to be by both insects (entomophily) and birds (ornithophily) and is reflected by such floral characters as color and size. Those species having red tubular flowers, i.e. *Fouquieria splendens, F. diguetii, F. macdougalii,* and *F. formosa* are visited by hummingbirds. The inflorescences of these species are produced terminally on the branches, thereby discouraging visitation by perching birds. However, the inflorescence of *Fouquieria ochoterenae* is produced all along the relatively thick branches, thus promoting visitation by larger, perching birds. Yellow grosbeaks and doves have been reported as visitors to the flowers of this species. The remaining species of *Fouquieria* produce relatively short, whitish flowers with abundant nectar. These are visited primarily by insects. Fifteen species of bees were reported to visit the flowers of the Boojum Tree, *F. columnaris* (Humphrey and Werner, 1969). The flowers of the boojum have inwardly folded (inflexed) petals which must be pried open by the bees to obtain the abundant, sweet nectar. An interesting feature noted by Henrickson is the presence of unicellular hairs (trichomes) at the base of the stamens. In addition, the base of the stamen develops into an arch that extends above the ovulary. In *F. splendens* the ovulary is eventually sealed by this combination of structures, producing a chamber. The trichomes arising from the arch are often covered with nectar. Henrickson suggests that the nectar is drawn up between the stamens from the ovulary base by the trichomes by capillary action. As a result, the nectar is available to the pollinator above the ovulary, thereby giving the ovulary some protection from hummingbird beak damage. In the center of the shorter, whitish, more open flowers of *F. burragei* and *F. shrevei*, Henrickson noted the presence of numerous trichomes and suggests that these trichomes may reduce nectar evaporation greatly.

Members of the Fouquieriaceae have been utilized in various ways. The copious waxy exudate of *Fouquieria shrevei*, a unique character of this species, is burned and used as incense, emitting a very pleasant fragrance. The flowers of *F. splendens* have been eaten raw by Pima Indian children as a snack, probably because of the sweet nectar. This species can also be used as a "living fence". The tall trunks of the boojum tree, *F. columnaris*, were used as fence posts by Baja California natives. A commercial boot polish of high quality, that was marketed at the turn of the century, was basically

SPECIES	DISTRIBUTION	HABIT	INFLORESCENCE TYPE	COROLLA COLOR
F. macdougalii	From the Sonoran Desert of central Sonora southward to the tropical deciduous forest along the Sierra Madre Occidental of southeast Sonora and Chihuahua and to the thorn forest of southcentral Sinaloa.	arborrscent	loose, flat-topped panicle	scarlet
F. diguetii	Common in the Sonoran Desert of Baja California from about 40km north of Punta Prieta south to Cabo San Lucas with disjunct populations near Guaymas and islands in the Gulf of California.	arborescent	conical panicle	scarlet
F. burragei	Known only from widely scattered populations near the Gulf Coast of Baja California from Bahia Concepcion. south to La Paz and on adjacent islands in the Gulf of California.	arborescent	narrow panicle	pale pink to whitish
F. leonilae	Known only from Canon del Zopilote south of the Rio Balsas in Guerrero.	arborescent	long spike	dark red
F. ochoterenae	Known only from southwestern Puebla and adjacent Oaxaca.	arborescent	Flowers borne all along the upper branches	dark red
F. formosa	From Lago de Chapala region of Jalisco to southeastern Oaxaca.	arborescent	short spike	red to orange-red
F. splendens ssp **splendens**	From Sonoran Desert of southern California, Arizona and southernmost Nevada south to Baja California and Sonora, and in Chihuahuan Desert, and Texas south to Zacatecas and northern San Luis Potosi.	Ocotillo	narrow panicle	red to orange-red
F. splendens ssp **campanulata**	Along the eastern edge of the Sierra Madre Occidental west of the Chihuahuan Desert from the vicinity of Santiago Papasquiaro north to Inde and east to the Rio Nazas Basin near Rodeo.	Ocotillo	narrow panicle	pink to orange-red
F. splendens ssp **breviflora**	Scattered disjunct populations in low arid basins from San Luis Potosi and Tamaulipas south to Hidalgo and Queretaro.	Ocotillo	narrow panicle	reddish orange to strong yellowish pink
F. shrevei	Known only from a few scattered gypsum outcroppings in the Bolson de Mapimi region of the Chihuahuan Desert in western Coahuila.	Ocotillo	solitary or in pairs	white
F. fasciculata	Known only from southern Hidalgo in the barrancas west of the Sierra Madre Oriental north of Actopan and Atotonilco el Grande.	succulent	dense, flat-topped panicle	cream-white
F. purpusii	Known only from a few localities in southern Puebla and northern Oaxaca.	succulent	dense, flat-topped panicle	cream-white
F. columnaris	Restricted to the arid Sonoran Desert between El Rosario and Santa Rosalia in Baja California, on Isla Angel de la Guarda on the Gulf of California and in a small area south of Puerto Libertad on mainland Sonora.	succulent	terminal panicle	cream-yellow

the wax from the epidermis of *F. splendens*. The seeds of this species are also edible though of dubious palatability.

Of the 11 recognized species, seven are considered restricted endemics and these endemics may possibly be declining species (Henrickson, 1972). This is unfortunate since little is known of the phylogenetic relationship with other families of vascular plants. With the exception of the species *F. leonilae* and *F. formosa*, representatives of all the taxa have been transplanted and established within the Desert Botanical Garden.

This is an interesting and unique family. The reader is encouraged to refer to the well-illustrated and thorough work by Henrickson (1972) which also includes an extensive bibliography.

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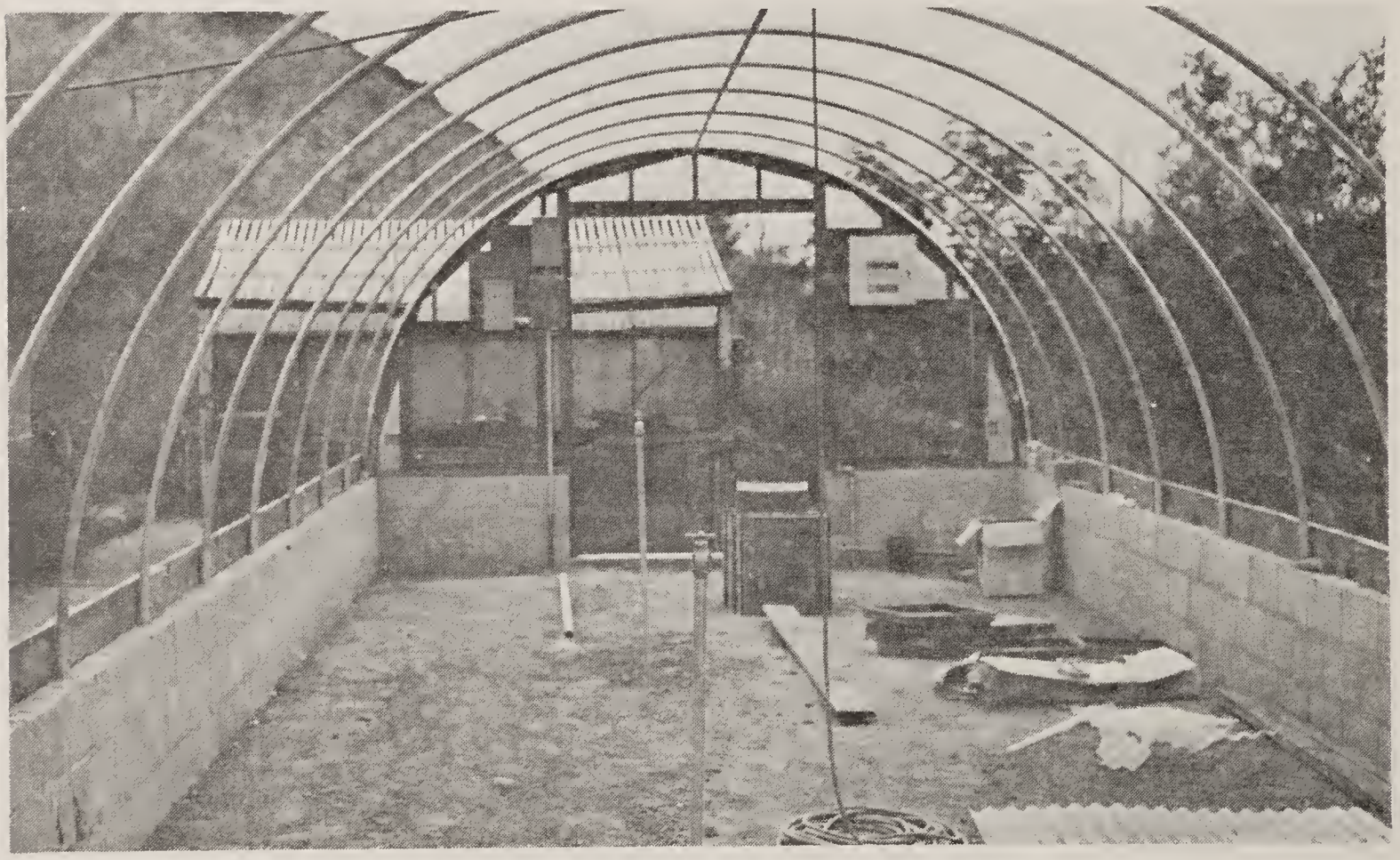

News & Notes (cont.)

and this year there are more interesting things to buy than ever before. A very nice way to help support your Garden.

* * *

Training classes for new Garden Docents have just begun. There are still a few places open for special people — if you've been an active Garden Member for a few years you probably know the background material being taught in the first two sessions, and you are eligible to join the remaining classes and become a Garden Docent this year instead of having to wait until next year. It's nearly too late, so phone in right away.

CALL IT LOBIVIA

In any filing system there's a catch-all category for the letters, papers or objects that simply defy logical classification. Sometimes it's labelled "Miscellaneous" sometime "Et Cetera" and we know one office manager who refers to it as the ragbag.

Well, we've discovered the cactus nomenclature ragbag — it's the genus Lobivia, devised by none other than the revered Britton and Rose, a non-permanent and rather uneasy assemblage of some 75 species of Andean cactus that nobody to this day seems to be able to classify any other way. Got a Trichocereus whose flowers aren't quite typical? Call it a Lobivia. Got a Cereus that blooms in the daytime instead of night? Call it a Lobivia. An Echinopsis that's different? Lobivia. Or so it seems to us.

You can't blame the botanists. What we're dealing with is a sub-tribe of the Cereus tribe of cactus where the genera intergrade or hybridize so readily that the borderlines between genera, to say nothing of species, are very hard to define. J. D. Donald theorizes that the genera Lobivia, Mediolobivia, Echinopsis and Trichocereus intergrade so thoroughly possibly due to the fact that cacti appear to be recent arrivals in the plant world and these particular plants have yet to become distinct, separate genera.

Let us take comfort in the words of Martin, Chapman and Auger — "With Lobivias, perhaps there is much to be said for not worrying too much about their names, but for growing them for the beauty of their flowers" — and go on to the unquestioned appeal of these beautiful and easy-to-grow cacti.

Lobivia huascha comes in different shapes and sizes, from short and round to tall and thin. There are two main flower color forms, yellow and red, which can produce varying in-between shades. The red form is spectacular, as much as four inches across and something like an Echinopsis flower without the very long tube. Though flowers last only a day or so, the plants produce flowers copiously and make a dramatic show. This species comes from the middle highlands of northern Argentina.

Because it is an Andean cactus, most growers tend to use it as an indoors or lathhouse plant, but it can do very well outdoors here if given some protection from sunburn during the heat of the summer. Some years ago I cut the head off a specimen of *L. huasca* when I was working on grafting, and grafted it onto another cactus. Both the graft and the original plant are doing well in pots in my back yard, the headless plant having rapidly grown two new heads, and the grafted one thriving equally. Specimens here at the Garden are in fine condition.

Flowers are self-sterile, so if you want seeds you will need to have at least two specimens from different clones flowering at the same time.

Whatever the plant is eventually called, it's a very satisfying addition to any cactus garden today.

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——P.Q. and L.D.

Original drawing by M. E. Eaton for Britton & Rose.

Palo Dulce , a 400 Year Old Medicine

This month's cover shows the white flowers of the Palo Dulce tree (*Eysenhardtia polystacha*), visited by a Cassius Blue butterfly. As one of the small trees of the Sonoran Zone in Arizona and in parts of Mexico, it isn't particularly noteworthy for appearance or rarity. It hasn't the handsome flowers of many other plants in the Legume Family, and its foliage has an unpleasant smell, but it was recorded as an important medicinal plant four hundred years ago, and its use stretches even farther back into the past.

One of the rare and significant books in the Garden's Richter Library is the Roman edition of "History of the Plants of New Spain" by Francisco Hernandez "doctor and historian of Philip II, king of Spain and of the Indies, and First Physician of all the New World." Only a few decades after the Spanish Conquest in 1519, the king sent Hernandez to Mexico to collect botanical and other information, and his manuscript, after many vagaries, saw publication in 1651 and became the major sourcebook on the new plants of the new world.

Hernandez not only described the plants, but also recorded their medicinal uses by the Aztecs. Many of those ancient remedies are no longer used, but Palo Dulce is still prepared in the manner he described, and is still used for the same ailments:

"The water in which slivers of the wood have been soaked for some time takes on a blue color and when drunk refreshes and washes the kidneys, makes urine less acid, extinguishes fevers and cures colic."

Martinez' "Plantas Medicinales de Mexico", 1939, which deals with many of the same plants as the Hernandez book, says that "during the colonial era (Palo Dulce was) known for various kidney ailments. Today it is used as a diuretic," and John Hilton, the well-known painter and naturalist, wrote in his "Sonoran Sketchbook", 1947, that once, when he was thoroughly weakened by malaria and dengue fever, an Indian woman in Sonora gave him a brew prepared from this wood, and in ten days he found himself thoroughly recovered.

The late Charles Mieg, writing for the Saguaroland Bulletin in 1969, mentions Hilton's report and two other reports, unfortunately not substantiated, that Palo Dulce was effective in overcoming anemia. All of which makes one wonder why medical researchers don't appear to be interested in this ancient remedy so far as we know. As Mieg says, "eventually we may discover something of real value."

Mulching a Desert Garden

Perhaps no single gardening practice, for both vegetables and ornamentals, is as beneficial as mulching, especially in the low deserts of Arizona. By covering the soil around growing plants, moisture is retained and available for immediate use. Mulching insulates the soil and keeps it cooler in summer and warmer in winter. Mulch, if applied liberally, keeps weeds down and protects sprawling plants (such as many vegetables) from the damage or rot that can occur when they touch the ground.

During the early stages of plant growth and during warm weather when the plants' need for water is greatest, the reasons for mulching are obvious.

Mulching has one more advantage — it's beneficial to the gardener. Since I began to mulch my entire garden I weed less and water less, and the work has been cut by at least fifty per cent.

You can use organic or inorganic mulches, and many types are available at nurseries and garden supply stores. Some are very costly, but some cost next to nothing if one is not concerned with aesthetics — as would be the case in your backyard vegetable garden.

Inorganic mulches like river rock, colored stone, cinders and granite are attractive in the ornamental garden but not practical for a vegetable garden. Like the synthetic mulches (plastic, aluminum

foil, tar paper), they are expensive. The plastic and paper mulches usually last only one season, and need to be replaced every year.

Organic mulches like peat moss, sawdust, grass clippings and cottonseed hulls are cheaper (some of them cost nothing) and much more practical. At the end of the growing season they can be worked into the soil to improve the structure and workability of the soil. For your ornamentals peat moss and sawdust make good looking mulches if you have a border around the beds.

Mulch must be deep enough to be effective. The depth depends on the material you use. Many gardening books list recommended depths for different mulches, but since conditions here in the desert are harsh, effective applications should be thicker than the books recommend. With organic mulches I feel that the minimum depth has to be between two and three inches, more for looser materials.

Sawdust and wood bark chips should be applied two to three inches thick. Wood shavings need a thickness of three to five inches, and all three should be composted before turning them back into the soil.

If a shredder is available, tree leaves make a good mulch, and should be applied in a layer about three inches thick.

Straw and hay are old-fashioned materials and are good mulches, but aren't effective unless they are four or five inches thick.

My own choice for my vegetable garden is a two-inch layer of grass clippings. It's my choice because it's free, and it works very well. I have a bermuda grass lawn, and after I mow it I let the clippings set for a week and then apply to the vegetable garden. I try to maintain a layer two inches thick.

You can also use newspaper. Every household accumulates newspapers, and they make a very good mulch. Pretty it's not, but efficient, yes. Put it on in layers one-half to one inch deep and hold down the edges with stones or spadefuls of soil.

Apply synthetic films one or two layers thick. Although they are good for keeping down weeds, they can cause poor aeration of the garden soil since they almost completely inhibit evaporation.

Sooner or later any desert gardener who wants healthier plants and wants to save water and labor is going to start using mulches. It just makes good sense.

——Marc Mittleman

Wild Botanists I Have Known, by D. C. Speirs

If you were to ask the average person what his image of a botanist was, something like the following might emerge.

"Mild mannered, strong tendency towards absent minded behaviour, enjoys dissecting plants, usually found in dusty herbariums examining even dustier plants; hobbies include renaming well known plants, publishing or perishing, and giving lectures."

The above description may or may not be true, and undoubtedly there are a few Dr. Casper Milquetoasts in the field. I have also seen giants (1.9m height, 100kg weight, hobbies include weightlifting and karate) who gain tenure because no university chancellor in his right mind would risk the chance of spending several weeks in hospital if tenure is denied.

Many varieties of botanists exist. Some take active part in sports. One individual, who fancied himself a baseball player, was recently observed trying to impress his girlfriend. He plucked an apple from a nearby tree and hurled it four blocks but accidentally hit some sisters of the Catholic faith. This was clearly a case of someone throwing **Malus** towards nuns.

Other varieties of botanists show a distressing tendency towards gullibility and are referred to as greenies.

Another variety of botanist is the taxonomist. There are two forms of taxonomists, namely splitters and lumpers. Splitters will classify as new species every individual plant they come across. Lumpers exhibit an opposite behavioural

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pattern in that they "lump" everything green into the same genus. In between these two extremes is the moderate taxonomist who is constantly trying to reconcile the splitters and lumpers. Moderates can be recognized by their long list of publications and a singular talent at publishing in obscure journals.

This article, which delighted both the wild and the semi-domesticated botanists at the Garden is reprinted with permission from KINNIKINNICK, *the newsletter of the Friends of the Botanic Garden of the University of Alberta in Edmonton.*

Garden Events

NOVEMBER

FIELD TRIP—BOX O WASH. Many different prickly pears and cholla cactus. November 18 at 8 a.m.

DECEMBER

WORKSHOP—HOLIDAY DECORATIONS. Ideas and techniques using native and easily collected materials. This year, a Mexican flair. 1 Tuesday session (bring lunch). Fees include most materials. December 5, 9:30 a.m. to 2 p.m.

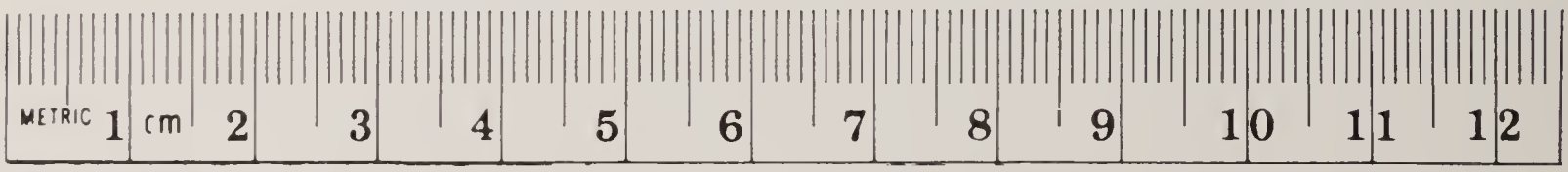
WORKSHOP—HOLIDAY DECORATIONS. Repeated on Friday, December 8, 9:30 a.m. to 2 p.m.

FIELD TRIP—ORGAN PIPE NATIONAL MONUMENT. Always a great trip. Birds, too. December 9, 8 a.m.

LUMINARIA NIGHT. Feliz Navidad! The whole Garden will be lit with traditional Southwest luminarias. Music and refreshments planned. December 19, 7 to 9 p.m. Whatever you do, don't miss it!

For class fees, field trip reservations and other information,
telephone 947-2800 or 946-9942

The Garden is open every day of the year from 9 a.m. to sunset.



SAGUAROLAND BULLETIN

DECEMBER, 1978

SAGUAROLAND BULLETIN Editor, Lillian Diven

DECEMBER, 1978 Vol. XXXII No. 10

DESERT BOTANICAL GARDEN

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Cover: Luminarias lining the Auditorium steps and roof. See p. 119. Photo: Bill Cramer

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Published and owned by the Arizona Cactus and Native Flora Society, sponsors of the Desert Botanical Garden, P.O. Box 5415, Phoenix, AZ 85010. The Saguaroland Bulletin is published to disseminate information on the Garden and on desert plants and their culture. Issued 10 times a year.

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News & Notes

As you can see from this month's cover, the Garden is initiating what we hope will become a tradition — Luminaria Night. Bring your friends and family to what promises to be a festive occasion with Mariachis, refreshments, the public and you, our special friends.

* * *

For many years the Garden has "made do" with a tiny greenhouse which was unheated. This month will see the completion of a new facility, 14 x 52 feet. Our propagator will now have the tools to grow many new and different plants. The seed collected in southern Africa by board members Diven, Triesler and Rhuart this summer and fall will find a safe haven this winter. We thank you all for your continued support, because your membership has made it possible.

* * *

A new class of docents is soon to graduate. Some members are already making contributions to our educational program and joining in the activities of last year's class — and they've just finished painting and refurbishing the Docents' Room.

* * *

Sales of the Garden's new publication, **A Catalogue of the Flora of Arizona**, by J. H. Lehr have been brisk. Members can be very proud of their Garden's contribution to the knowledge of our state's plants.

* * *

Store Manager Lynn Trainum would like to remind the membership of the many fine gift ideas among the items in our shop. Plants, arts, books and Desert Botanical Garden t-shirts are available. This is the time of year to make your 10 percent member's discount and our no-sales-tax status work for you. Lynn also reminds members to bring their membership cards to the Garden, as our growing family makes recognition of every member on sight impossible for entrance and discount privileges.

* * *

Our new label machine is going into high gear and new signs are cropping up like wildflowers.

* * *

Marlo Coleman of KAET-TV was in the Garden in November for four and a half hours, taping a three-to-five minute Thanksgiving segment for News Center 8. A lot more work goes into television production than the viewer eventually sees, it seems.

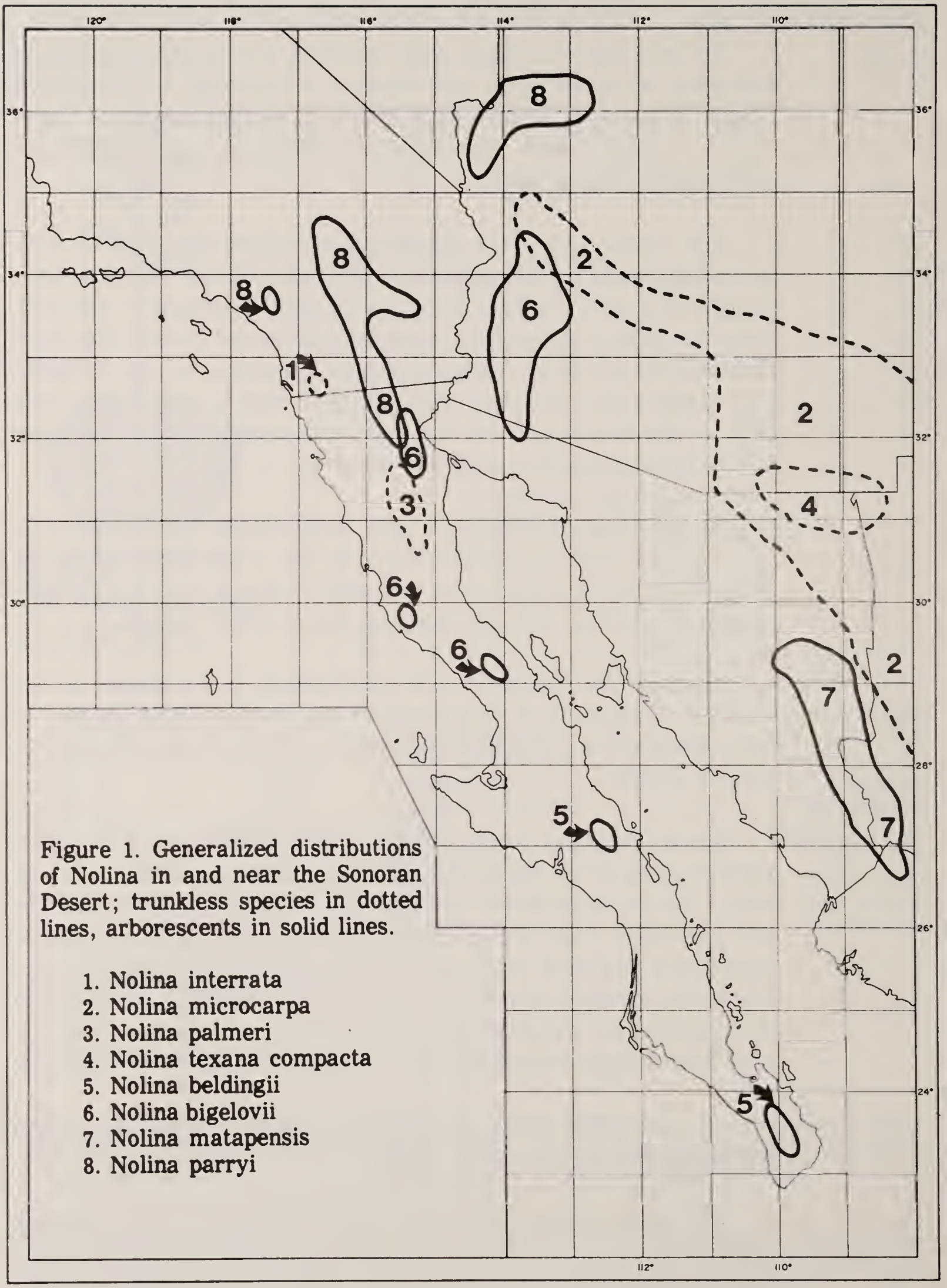

Figure 1. Generalized distributions of Nolina in and near the Sonoran Desert; trunkless species in dotted lines, arborescents in solid lines.

1. Nolina interrata
2. Nolina microcarpa
3. Nolina palmeri
4. Nolina texana compacta
5. Nolina beldingii
6. Nolina bigelovii
7. Nolina matapensis
8. Nolina parryi

NOLINA IN AND NEAR THE SONORAN DESERT

by Howard Scott Gentry

Nolina has been a respected generic name ever since it was first described by the French botanist A. Michaux in 1803. It is an easy name, as generic names go, and no one should have trouble pronouncing it, as Latin, Spanish, or anglicized versions are quickly recognized and acceptable. There is no common name to apply to the twenty-odd species native to the southern United States and Mexico. Many botanists now recognize them as members of the Agave Family, Agavaceae, but they were formerly included in the Lily Family, Liliaceae.

The leaves were formerly employed by American Indians for weaving baskets, sandals and kindred artifacts, and are still so used by the Tarahumara and Warihio Indians of Chihuahua. One species is used in modern broom manufacture, and there is a potential market for the tree forms as water-conserving long-term ornamentals for landscaping parks and homes.

All Nolinas are of the rosette type, with the leaves rising from ground level or crowning the short to long thick trunks. The leaves are finely serrulate, like hacksaw blades, and narrow, flexible and often gracefully arching. The plants are dioecious and the flowers, whether male or female, are 6-petaled, whitish to light yellow, small but borne in large panicles which are conspicuous when they extend above the foliage. The fruits are dry, papery or chartaceous, usually 1-seeded, and hang on very slender jointed pedicels. Although the fruits are only ¼ - ½ inch in diameter, they make a showy mass in the large panicles crowning the rosettes. The following is a brief annotated account of the species in or near the Sonoran Desert; mapped in Figure 1.

Plants without trunks, the leaves in grass-like tufts from woody root crowns.

1. **Nolina interrata** Gentry — Buried Nolina

This is a rare plant known only from a small area in San Diego County, California, growing in dispersed chaparral vegetation. It is distinguished by a log-like underground ("buried") caudex paralleling the ground surface, with well-spaced, few-leaved rosettes scarcely 1 m tall. The leaves are glaucous, scabrous, and about 15 cm wide above base. The flowering stalk is 1.5 - 2 m tall, laxly flowered, with long narrow bracts, and the dry inflated fruits 12 - 15 mm broad. It differs from the similar appearing **N. palmeri** by its large non-rupturing fruits. Since its original discovery near the Dehesa School, 8 miles east of El Cajon, it has been reported by T. A. Oberbauer (letter) that there are limited stands on McGinty Mountain and Sequan Peak south and southeast of Dehesa.

2. **Nolina microcarpa** S. Wats. — Bear Grass, Sacahuiste

This is one of the most widespread nolinas, occurring from central Arizona to Durango, Mexico. It occurs in open chaparral and on the grassy slopes of oak and juniper woodland from 3500 to 6500 feet elevations, Fig. 1. It is distinguished by its large dense clumps of leaves and tall laxly-flowered panicles, 2 - 2.4 m, with a long central spikelet in the lower flower clusters. Judging from its frequent occurrence in Indian ruins, especially in Casas Grandes, Chihuahua, it was much used for making baskets, mats, sandals and hats. The young flowering shoots were cooked and eaten. A modern use is for broom manufacture. According to Gary Nabhan (letter), the leaves are cut in southeastern Arizona, trimmed in Agua Prieta and sent to Alabama for making brooms, Fig. 2.

Figure 2. Cutting sacahuiste leaves for broom manufacture, near Sonoita. Photo: Karen Nabhan

Figure 3. Nolina parryi *ssp* wolffii *in chaparral southeast of De Anza, Calif.*

3. **Nolina palmeri** S. Wats. Palmer's Nolina

This is a grass-like tufted perennial limited to the dry mountain slopes of northern Baja California. Wiggins (1964) reports it as fairly abundant in the pinyon belt on Sierra Juarez and Sierra San Pedro Martir, where it ascends to 8000 feet elevation. In appearance it is much like **N. interrata**, but the fruits are only 4 - 5 mm wide and rupture early exposing the seed.

4. **Nolina texana** var. **compacta** (Trel.) I. M. Jtn. Sacahuiste

Relatively small densely cespitose plants with very slender curling leaves and with the short panicles over-topped by the leaves. The lower bracts on the short peduncles are very long-tailed, frequently longer than the panicles. This variety is common in the Big Bend country of western Texas and has been collected in the oak and grama grassland in southeastern Arizona. J. D. Robbins (letter) reports that it occurs in the Mule Mountains and on the north slopes of the Gunnison Hills, Ariz. The leaves of this plant, like those of **N. microcarpa**, are eaten by livestock, especially when other green browse is lacking. We need good specimens for our herbarium.

Plants with short to tall trunks, simple or branches.

5. **Nolina beldingii** Brandegee Belding's Nolina

Small to medium-sized trees, 3 - 7 m tall, with single trunks and eventually several branches densely crowned with long arching leaves. The leaves are 120-130 cm long, 1.2-2 cm wide above the base, and have long slender spineless tips; inflorescence a copiously flowered diffusive panicle 1.5-2 m long, usually arching, June - July. It forms scattered groves on the mountains of the Cape District in Baja California Sur. It resembles **N. matapensis**, but is a more robust plant with larger leaves, panicles, and fruits, Fig. 4.

With plenty of water and good soil it forms dense shade. The rate of growth and its tolerances are unknown. In fact, it is unknown in cultivation. Called "sotol" in Baja California.

6. **Nolina bigelovii** (Torr.) S. Wats. Bigelow Nolina

A short stocky arborescent plant with thick trunk commonly 1-1.5 m tall, single or forked, with dense crown of foliage, which persists deflected as dry skirts hiding the trunk. Leaves broad, commonly 2-3.5 cm wide, rather stiff, becoming smooth and filiferous along the margins, and towards the tips drying brittle, broken and stubby. From the northwestern borders of the Sonoran Desert south in Baja California along the desert side of the Sierra Juarez and San Pedro Martir ranges to Sierra Calamajue; also in the arid desert along the Arizona-Sonora border. Some of the best stands are on the broken slopes northwest of Wickenburg, which become showily conspicuous when flowering occurs in June and July.

7. **Nolina matapensis** Wiggins Matape Nolina, Palmito

A small slender tree with 1 to several branches crowned with rather small rosettes; leaves narrow, 80-120 cm long, 8-12 cm wide, with long slender tips; inflorescence 1-2 m long, openly branched, the lateral panicles diffusely branched, 15-20 cm long; fruits small for a tree nolina, 6-8 mm broad, much broader than long, depressed at apex, the pedicels more than twice as long as the fruits, jointed near base. Southeastern Sonora and southwestern Chihuahua in the oak woodlands of the Sierra Madre Occidental, generally between 3000 and 5000 feet elevations. This handsome plant has recently been introduced for ornamental culture in California and Arizona (Kimnach 1976). It appears to be preadapted for use in rock and succulent gardens in arid climates. The more tender leaves in the long terminal buds are used for weaving baskets, and the longer trunks for constructions in huts and corrals.

Figure 4. Nolina beldingii *with oak on top of Sierra de las Palmas, Baja California Sur. Spring 1954.*

8. **Nolina parryi** S. Wats. Parry's Nolina

With single stout trunks, rarely branched, 1-2 m tall with dense leaf crowns, the dry deflexed leaves skirting the trunks; leaves are rather stiff, short, 60-80 X 1.5-2.5 cm, with blunt weather-broken tips; fruiting panicles dense, 1-1.5 m long, pale shining yellow with large fruits 12-16 mm broad, and short pedicels jointed near the middle. Like **N. bigelovii** but differs with persistently serrulate non-filiferous leaf margins, larger petals, and stigma lobes on short styles rather than sessile. Of local scattered distribution from Mohave and Coconino Counties, Arizona across the Colorado Desert and south into northern Baja California, Fig. 1.

Literature Cited

Kimnach, M. 1976. Cact. & Succ. Jour. (US) 48: 92
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Why Not Grow Your Own?

Desert trees and shrubs, particularly long-rooted things like palo verdes and acacias, can easily become rootbound when grown in one-gallon cans to the size that will sell well in the nurseries — and people always tend to pick out the biggest plant in the row. The alternative, of course, is to grow them from seed.

But doesn't that mean you'll have to wait for years before the plants grow to any size at all? Not in our experience here at the Garden. In fact, it's just the opposite. The plants started in the ground grow faster than those transplanted from cans.

Plant the seeds in the springtime or fall. Prepare a well or basin where you want your future tree or shrub, and put about four seeds in the well, about four inches apart from each other. Water well, and when the seedlings appear prick out or transplant the weakest of them. If the plant is a legume you might first need to nick the seed covering before you plant it.

This is a money-and-labor-saving way to add shrubs and trees, unless you feel you have to have an "instant garden".

New cactus plants in the Garden, as a result of a staff collecting trip to Baja California this year include two species of Machaerocereus, **M. eruca**, the "Creeping Devil", and **M. gummosus** which is bushier and more erect. Also **Myrtillocactus cochal**, a medium-size tree cactus, and **Echinocereus maritimus**, a hedgehog cactus that can grow into meter-wide clumps.

We brought back some interesting seeds, too. The Blue Fan Palm, **Erythea armata**, and Palo Blanco, **Lysiloma candida**, are two species we look forward to growing here. As well as things like the **Opuntia invicta**, a species with stout stems and formidable flattened spines.

This fall we have been putting in a new section of the Succulent House devoted to caudiciform plants, with specimens of Beaucarnea, Bursera, etc., and are going to devote a section to the "mimicry" plants like Lithops and Pleiospilos.

It's time to start thinking about the Cactus Show, and the plants and cuttings that will be on sale during Show week. We hope you will look around your garden and see what of your extra cactus and succulents you can spare for this fund-raising event. Cuttings can be rooted now for the Show sale, and the Garden needs cans for potting them up and volunteers to do the potting. Please phone me if you'd like to donate plants, cans or time.

We have put together some source lists that Garden Members might be interested in. One is a list of names and addresses of dealers in cactus and succulent seeds, the second is a list of dealers in native tree and shrub seeds, and the third is of mail order sources of succulent plants. We'll be glad to send you any or all if you phone the Garden, or come by.

——Russell A. Haughey

Trichocaulon meloforme

An unusual plant of the Asclepiadaceae, the family that includes Stapelias, Hoodias and others, has found itself a new home at the Desert Botanical Garden. A good specimen of **Trichocaulon meloforme** was brought back to us by Henry Triesler from his recent sojourn in South Africa.

This interesting plant is one of the twenty-six or more species comprising the genus Trichocaulon, natives of South West Africa, South Africa and Madagascar. They are succulent perennials with very fleshy cylindrical to globose stems, covered with many tubercles. The genus is divided into three groups and our plant, **Trichocaulon meloforme**, is of the Cactoidea group, a seemingly odd name for a spineless plant, but so named from the first-known species of this group, **T. cactiforme**.

T. meloforme was discovered by Marloth in South West Africa, growing at an elevation of 4000 ft. between granite boulders. It is also found in north central Cape Province in South Africa, always in places that have exceptionally good drainage.

The plant grows to a height of about four inches. It has a solitary, nearly globose greyish-green stem, although occasionally two or three stems rise from the same root.

The star-shaped flowers appear at the apex of the stem and from between the tubercles. The outside of the corolla is dark claret red, while the inside is yellow with maroon spots. The tips of the lobes are uniformly maroon, a distinctive feature of this species. Flowers can be a half-inch wide, as in our specimen, but flower size varies according to the state of the plant, and in less robust specimens may be only a quarter of an inch wide.

Trichocaulons are temperamental plants to grow because they are highly susceptible to rot, but satisfaction is more likely if some rules are followed:

Their resting period is between January and July, during which time they should be watered very little.

In summer they need sun (filtered here in the low deserts), air circulation and moderate moisture. One way to make sure the roots will not sit in water is to set the pot within a larger pot, and fill the spaces between with moist gravel.

The soil mix used must drain well. A favorable mix would consist of equal parts of sand, peat and loam. Bits of gravel may be added if so desired.

Whether you are a grower of succulents or just an "observer", our new acquisition is worth coming to see.

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Collis, "Trichocaulons, Tavaresias and Hoodias" Natl. C&S Journ. March 1957
Jacobsen, Handbook of Succulent Plants
Luckhoff, The Stapelieae of Southern Africa
White and Sloane, The Stapelieae

——Marc Mittelman

A LEAFY CACTUS

All of the Opuntias have leaves, but in most species the leaves fall off soon after they appear, often in a matter of weeks. **Opuntia subulata** is an exception.

This handsome Cylindropuntia with bright green stems has large, persistent, almost cylindrical leaves that persist for a season or more. Since the leaves are long, two to five inches in length, and are tapered and curved, they give the plant a dramatic appearance. Add the fact that **O. subulata** is easy to grow, and it is plain why this is one of the popular Opuntias for indoors cultivation, alone or as one of the components of a dish garden.

Most available specimens of **O. subulata** are rooted tip-cuttings that quickly outgrow dish gardens, for this is a strong growing cactus that starts to branch when it is slightly more than a foot tall and soon spreads to overshadow other plants in the same container. In conditions similar to its native habitat (Chile and Bolivia at 3200 to 3670 meters altitude) it can reach a height of 15 feet if left unpruned, and is frequently used for hedges. Here in the southwest deserts such a size is unlikely, but it is worth considering as a large and interesting plant for a sheltered patio where it can be protected from sharp freezes. It will rapidly grow to fill a large planter.

Don't expect **O. subulata** to flower readily. It must attain considerable size and age before it produces the red or reddish flowers that appear from September to January.

Leaves finally drop off the lower stems to reveal strong yellow spines that sometimes measure more than three inches in length. These spines are probably the reason **O. subulata** has been called "Eve's Pin Cactus". At any rate, they have other uses than for holding fig leaves together. They make excellent pins for grafting cactus, either onto stems of **O. subulata** or other stock.

This cactus is an excellent one to start your own collection with, and even makes an easy-care gift for a non-cactus-fancier. The Garden's gift shop has a good supply of healthy rooted specimens on hand now, just in time for the holidays.

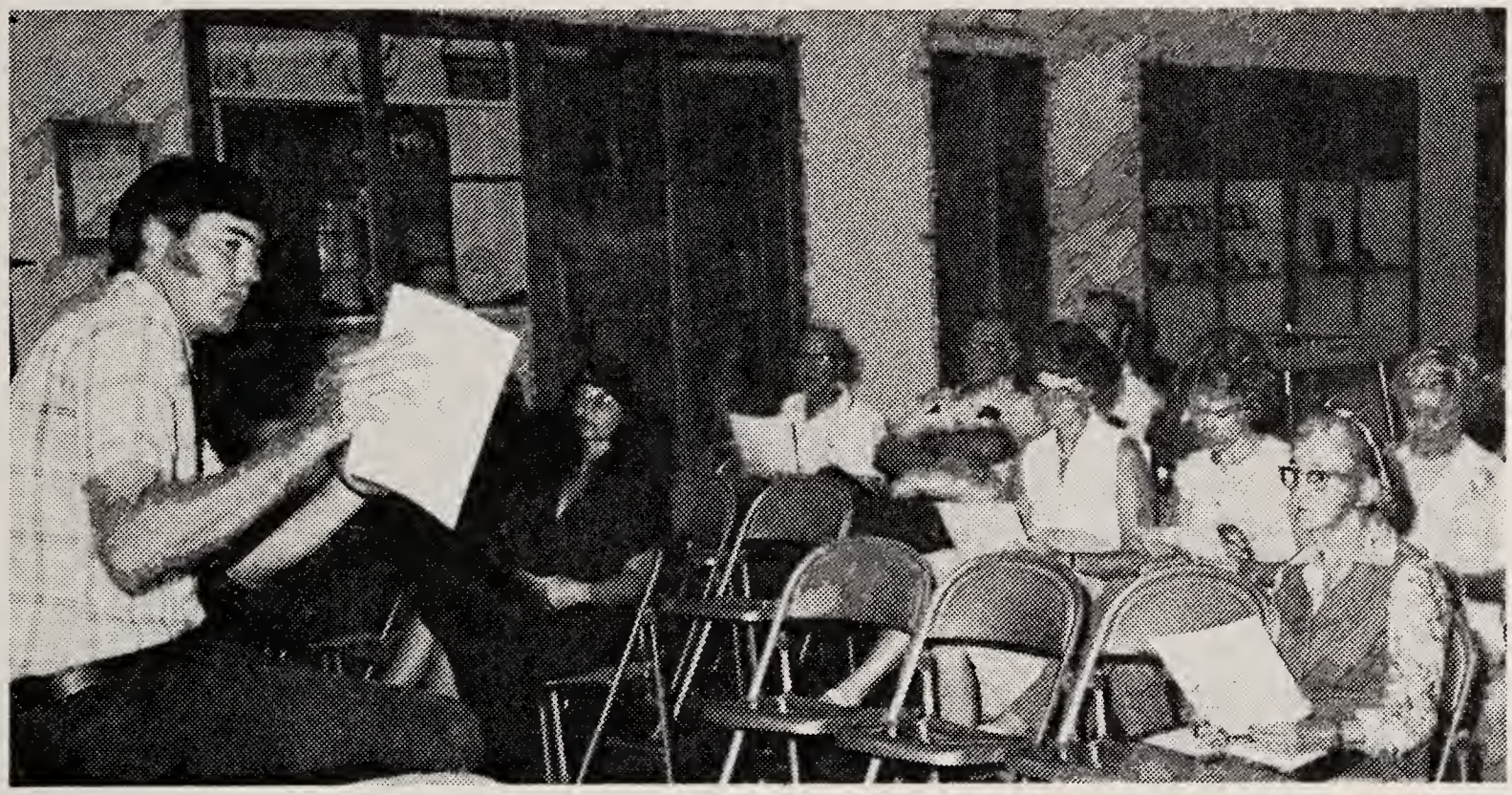
——LD

LUMINARIA NIGHT

It's a Southwest tradition, and one of the loveliest in the country. Let the people "back east" string Christmas lights on the blue spruce trees in their front yards, but they can't look more festive than our luminarias. The components are simple: a brown paper bag, a shovelful of sand, a candle. The results are festive. Warm, glowing lights along the coping of a flat roof, the patio walls, and edging the path to the front door for a holiday welcome.

This year the Garden began planning in June for the Luminaria Night open-house we'll hold on December 19th from seven to nine p.m. One evening in August our staff put together some fifty luminarias and Bill Cramer started photographing soon after sunset, at regular intervals, to get the right lighting for the picture you see on this month's cover. We ordered a thousand paper bags, a thousand candles, and planned where to put the thousand luminarias you'll see on the 19th. We made arrangements for refreshments. Henry Escalante's mariachi trio will provide traditional Mexican Christmas music.

Garden Members and the public are now hereby invited to come to our Luminaria Night on the 19th of December and help us celebrate the holidays!



Bill Cramer, who took our cover picture, also was on hand this fall when Victor Gass gave a class in desert geography. The Garden's classes and workshops for the first half of 1979 will include some brand-new things as well as repeats of popular events. There will be two field trips each month in March and April, and we're lining up "outside experts" for some very interesting courses. We've also scheduled monthly slide presentations and lectures — 1979 at the Garden will have a lot for Garden Members!

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Garden Events

DECEMBER

Cactomaniacs meet December 5, 8 p.m.

HOLIDAY DECORATIONS WORKSHOP. Using native and easily-collected materials. This year, a Mexican flair. Tuesday, Dec. 5 (and repeated on Friday, Dec. 8) 9:30 a.m. to 2:30 p.m. Bring your lunch.

FIELD TRIP — ORGAN PIPE NATIONAL MONUMENT. Saturday, Dec. 9, 8 a.m.

LUMINARIA NIGHT, Dec. 19, 7 to 9 p.m.

JANUARY

Cactomaniacs meet January 2, 8 p.m.

CLASS — INTRODUCTION TO THE DESERT. A basic course about Arizona's deserts, plant life and plant adaptations. 3 Tuesday sessions plus 1 field trip. Starts Jan. 9 at 2 p.m.

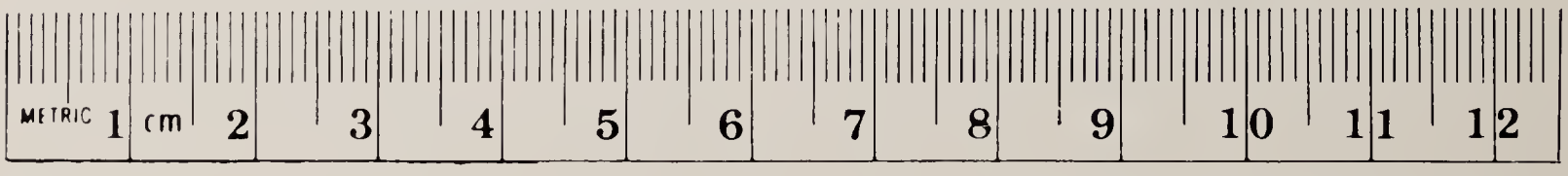
WORKSHOP — PRUNING. Techniques and tools for keeping trees and shrubs looking their best. Saturday, Jan. 13 at 10 a.m.

LECTURE — PUBLIC SLIDE PRESENTATION. Topic — Ocotillo and Their Relatives. Wednesday, Jan. 24, at 3 p.m.

FIELD TRIP — CASTLE HOT SPRINGS. Just NW of Lake Carl Pleasant. Visiting canyons in the foothills of the Bradshaw Mtns. Saturday, Jan. 27, 8 a.m.

Members' Preview of SECOND ANNUAL DESERT PHOTOGRAPHY SHOW. Jan. 25, 7 to 9 p.m.

SECOND ANNUAL DESERT PHOTOGRAPHY SHOW. Desert Plants landscapes as seen by skilled photographers. A juried show. Jan. 25 through Feb. 4.

For class fees, field trip reservations and other information,
telephone 947-2800 or 946-9942

The Garden is open every day of the year from 9 a.m. to sunset.